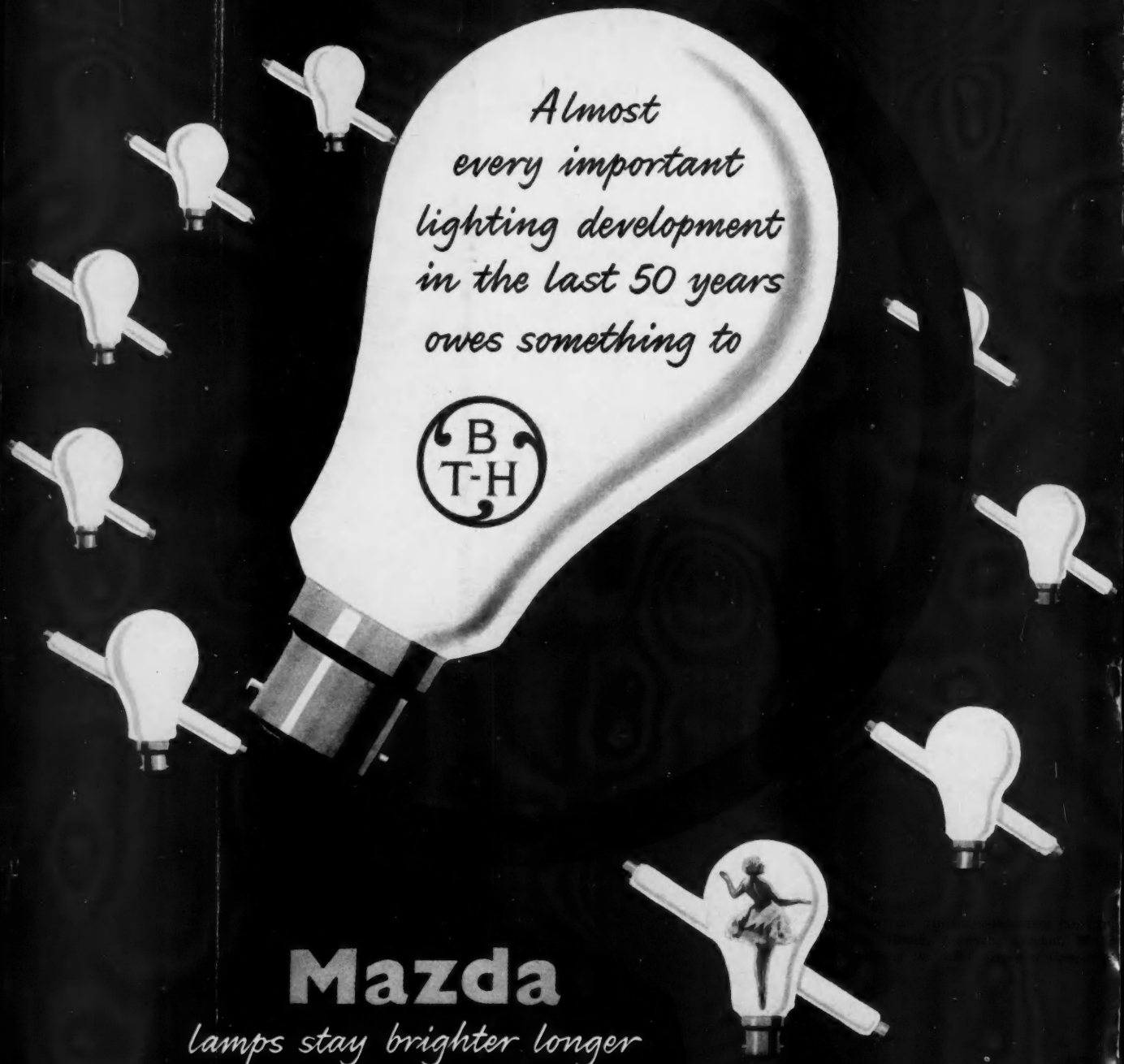
ELECTRICAL TIMES



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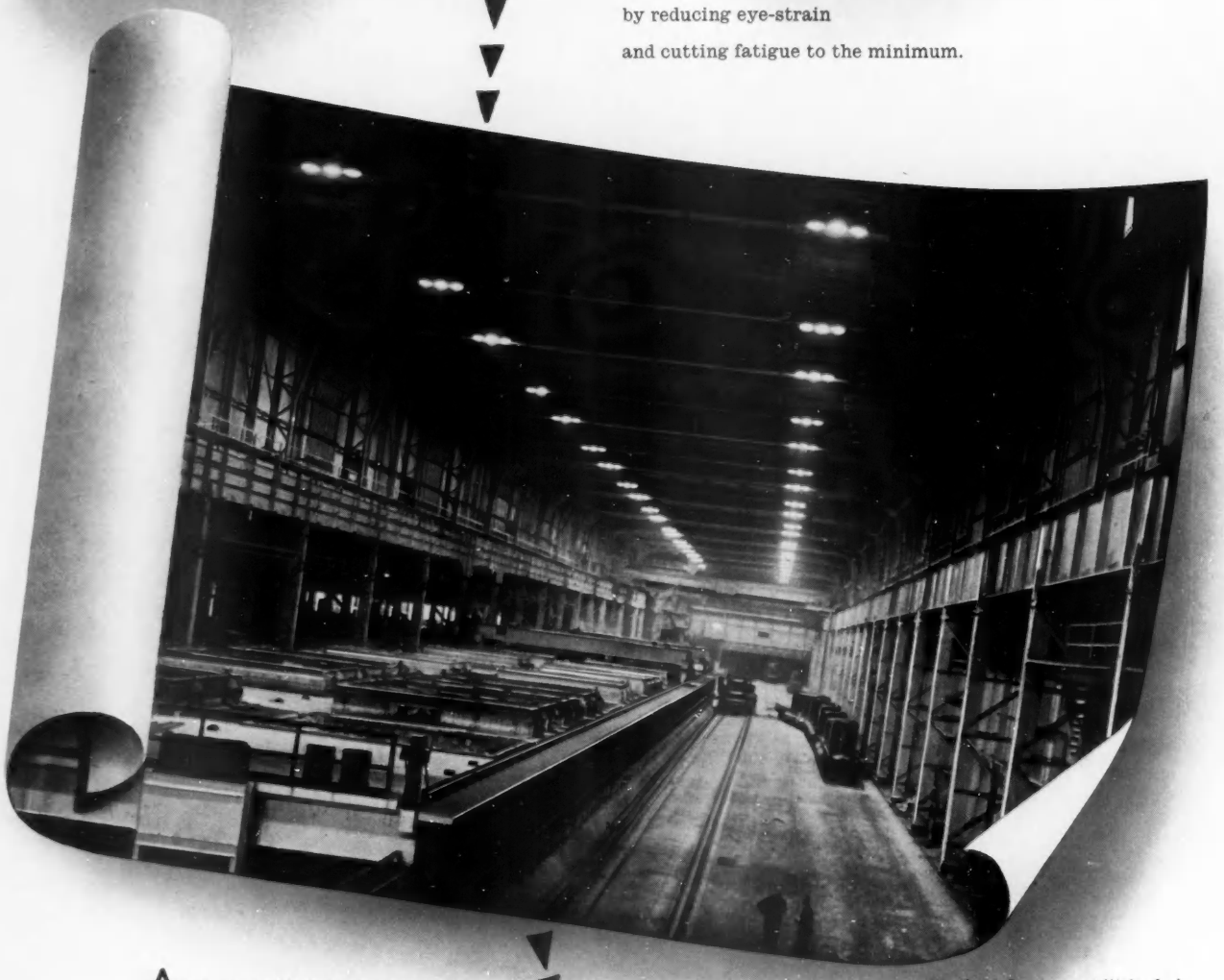

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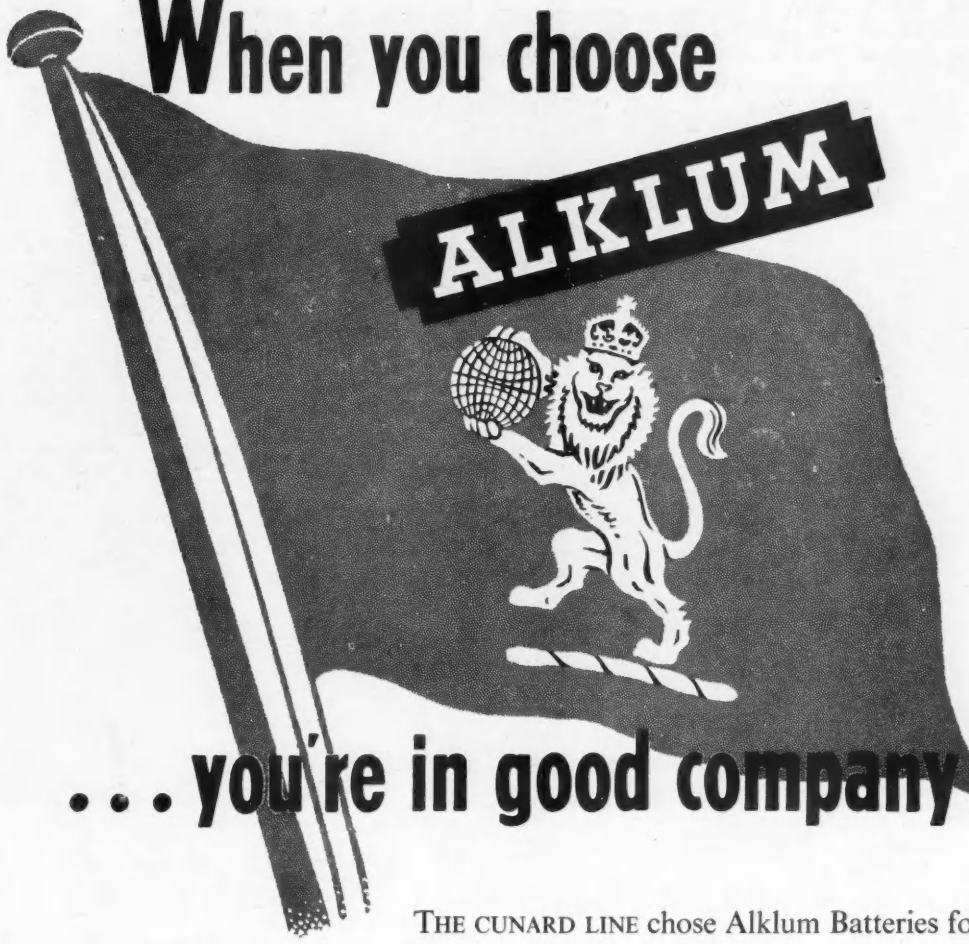

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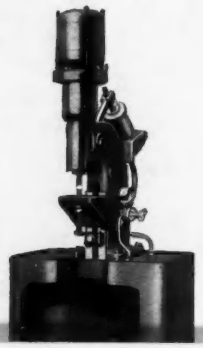

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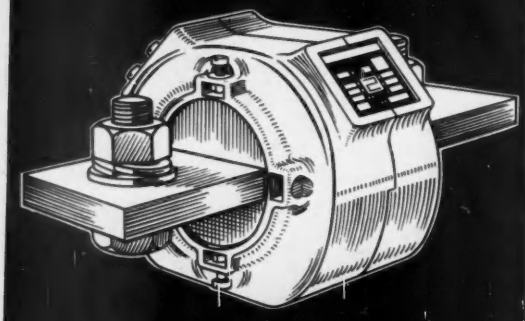

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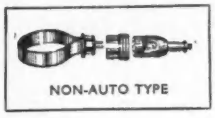

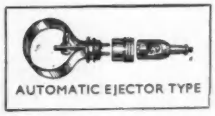

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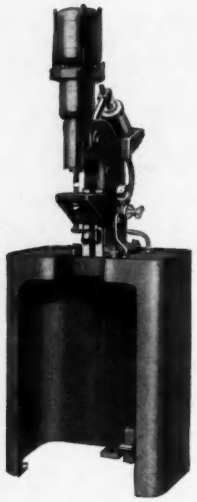

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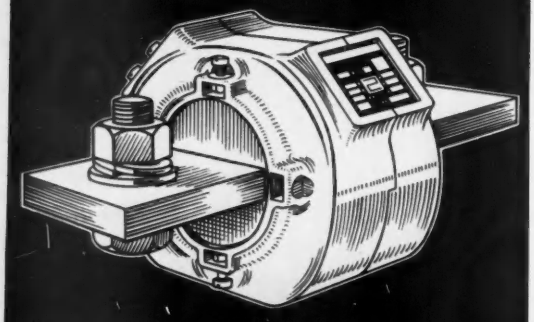

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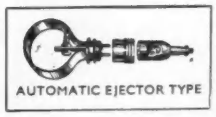

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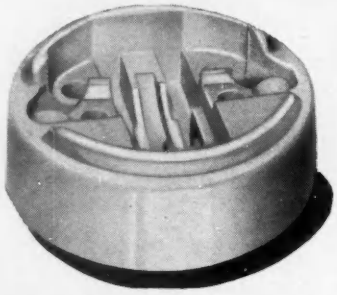

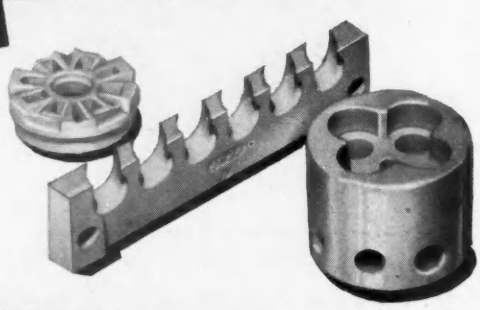

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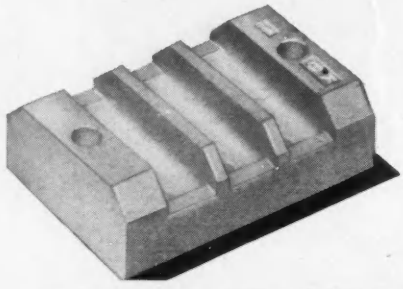

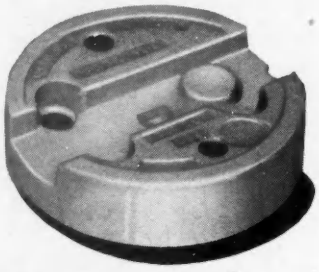

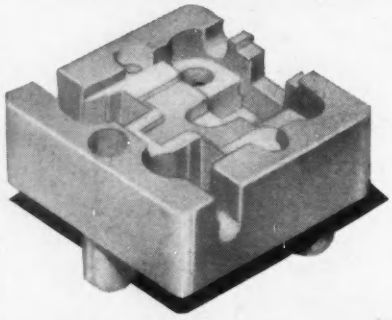

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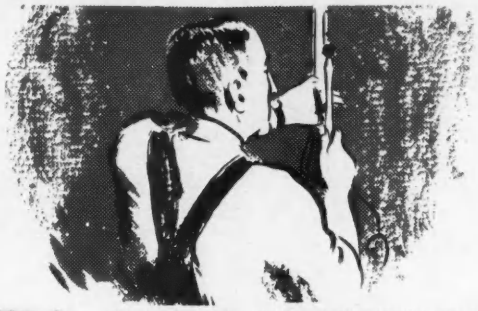

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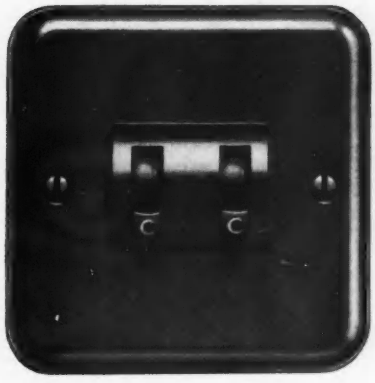

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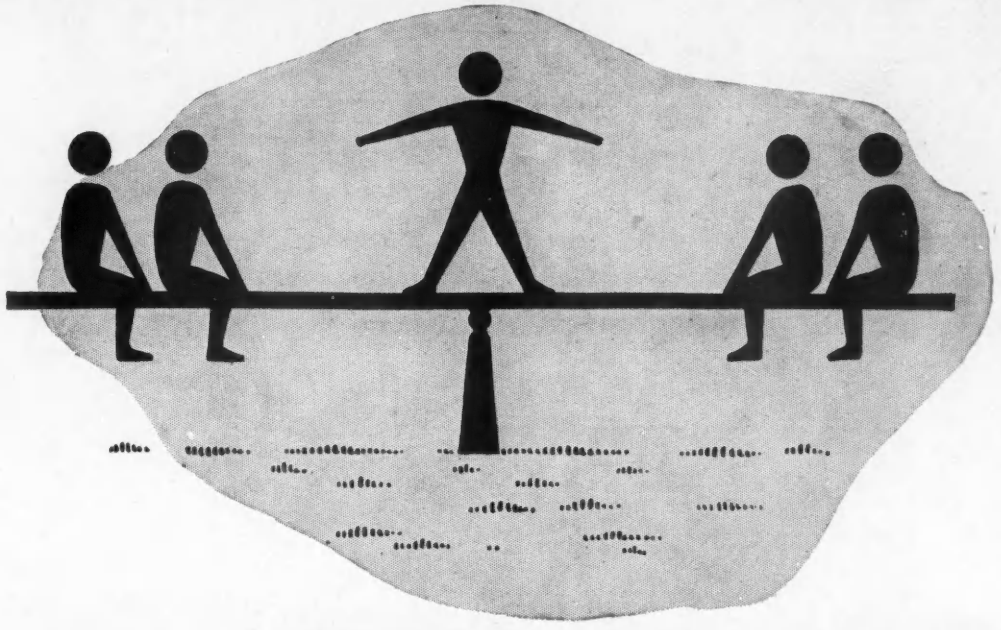

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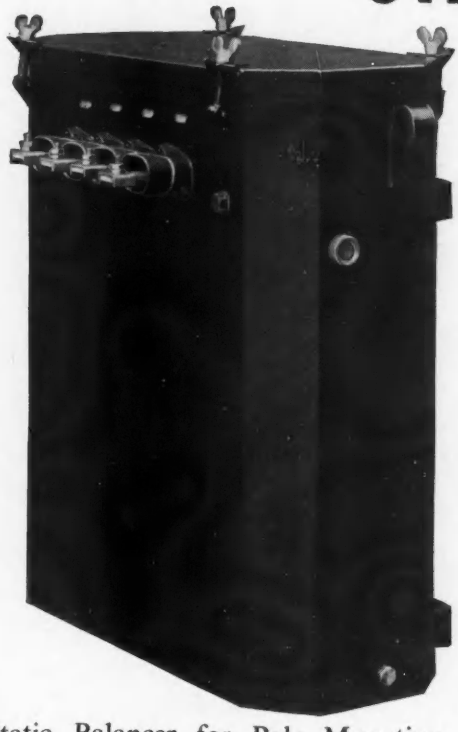

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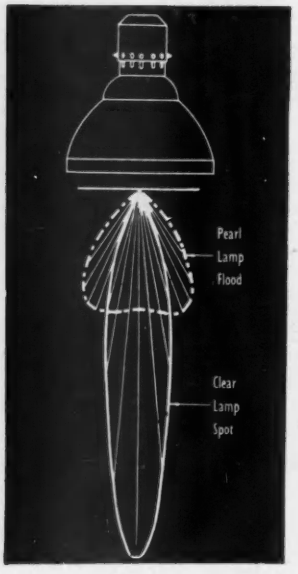

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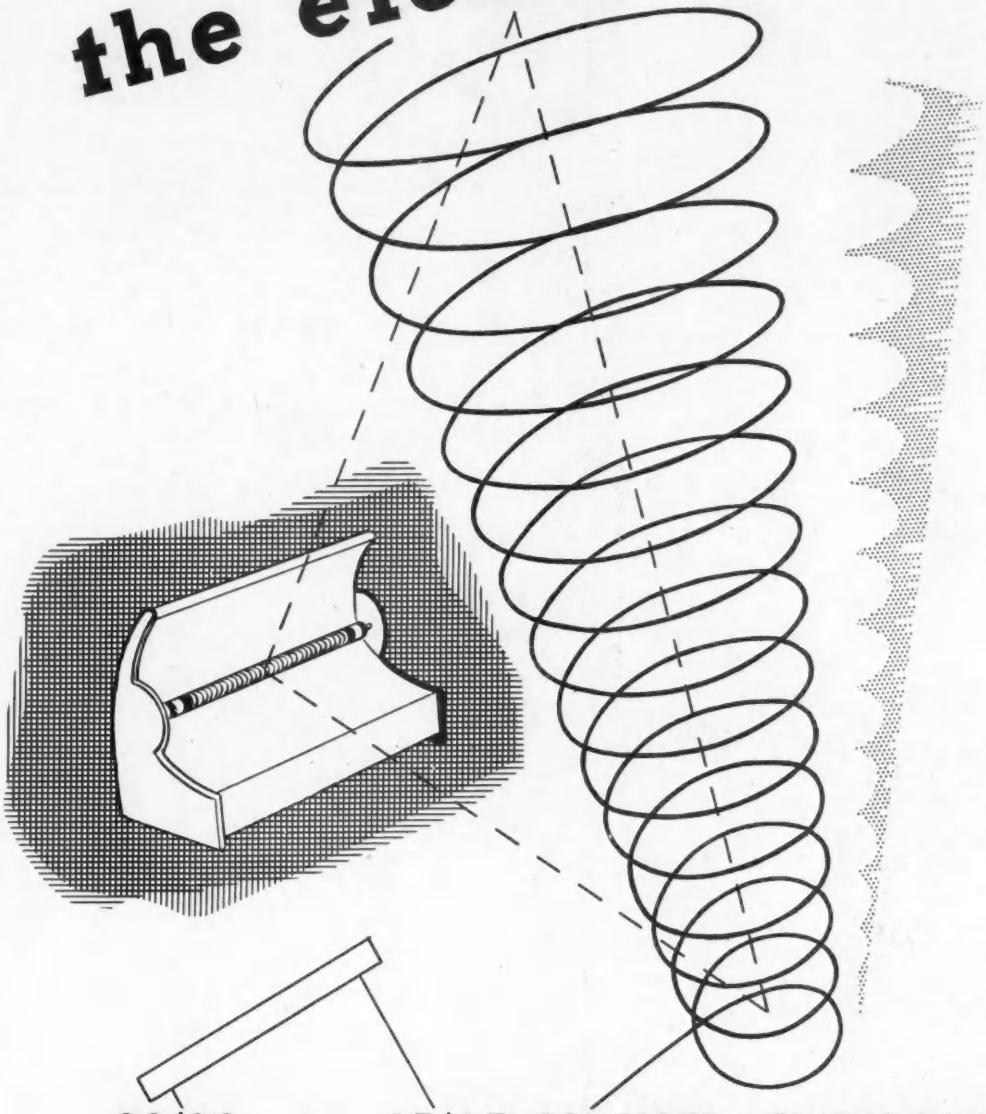

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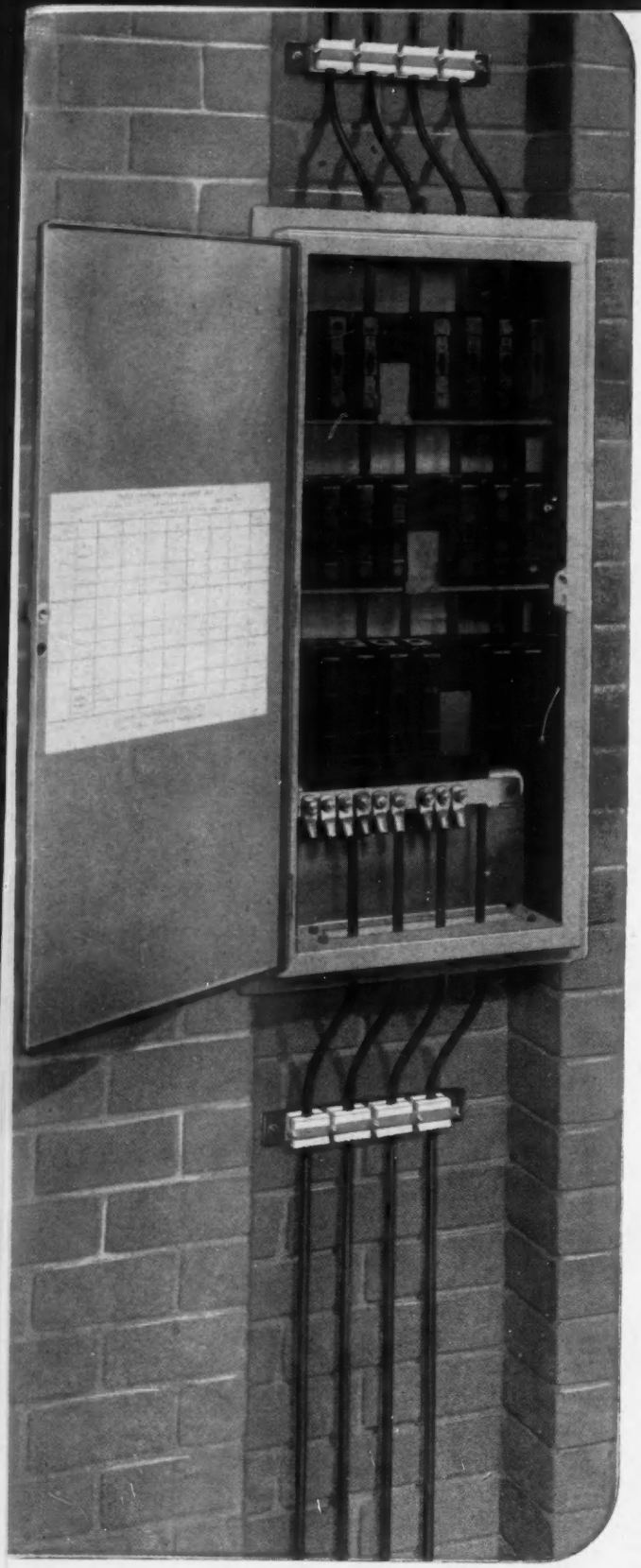

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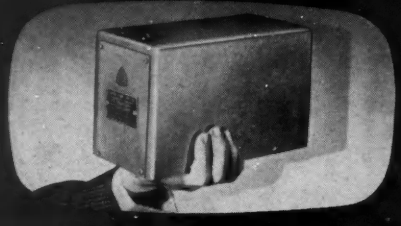

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ASR-1150 is merely one of an entirely new range of A-C Stabilisers, ranging from 200 VA to as high as 50 kVA—all dealt with in Catalogue V-549-S.

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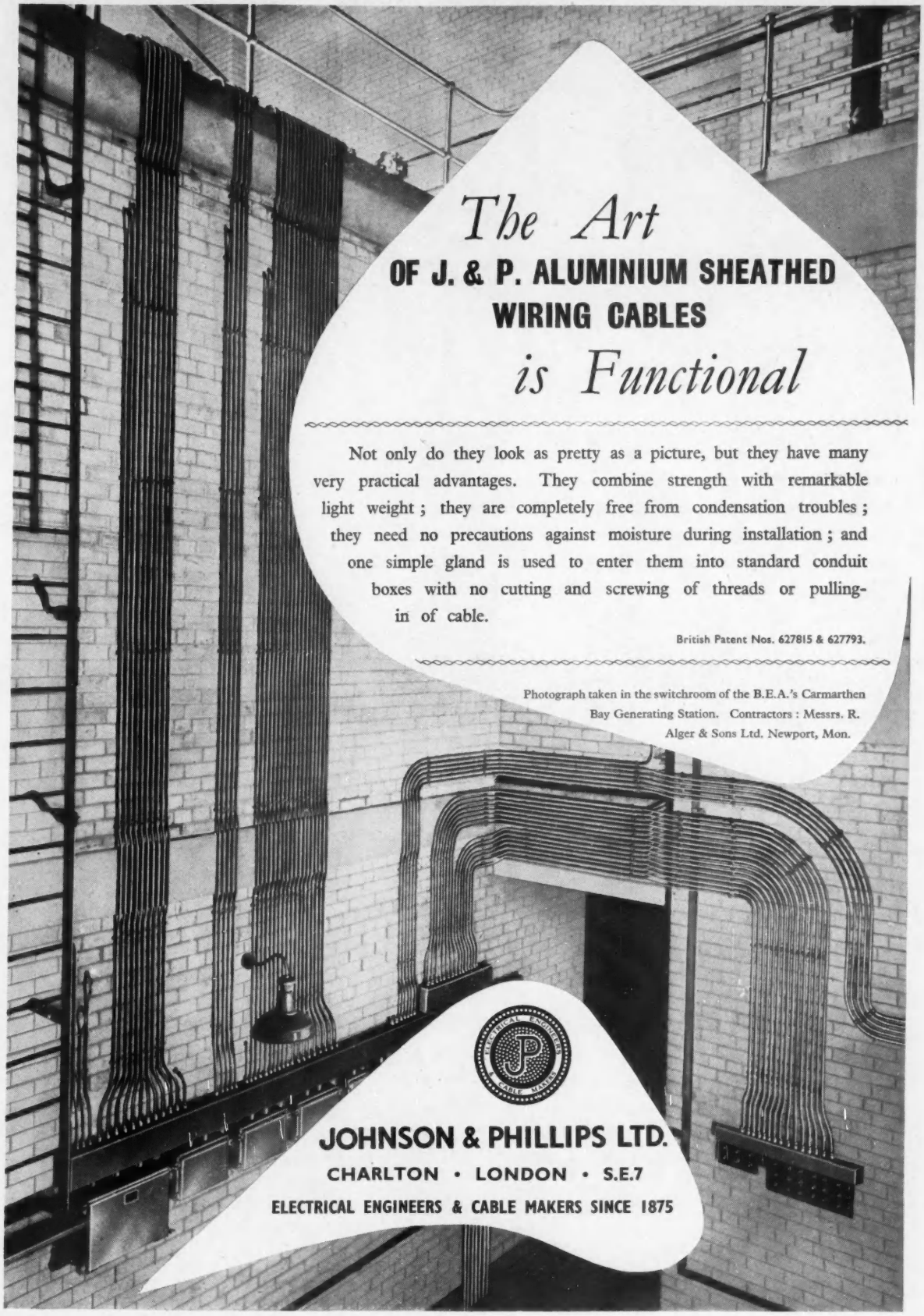

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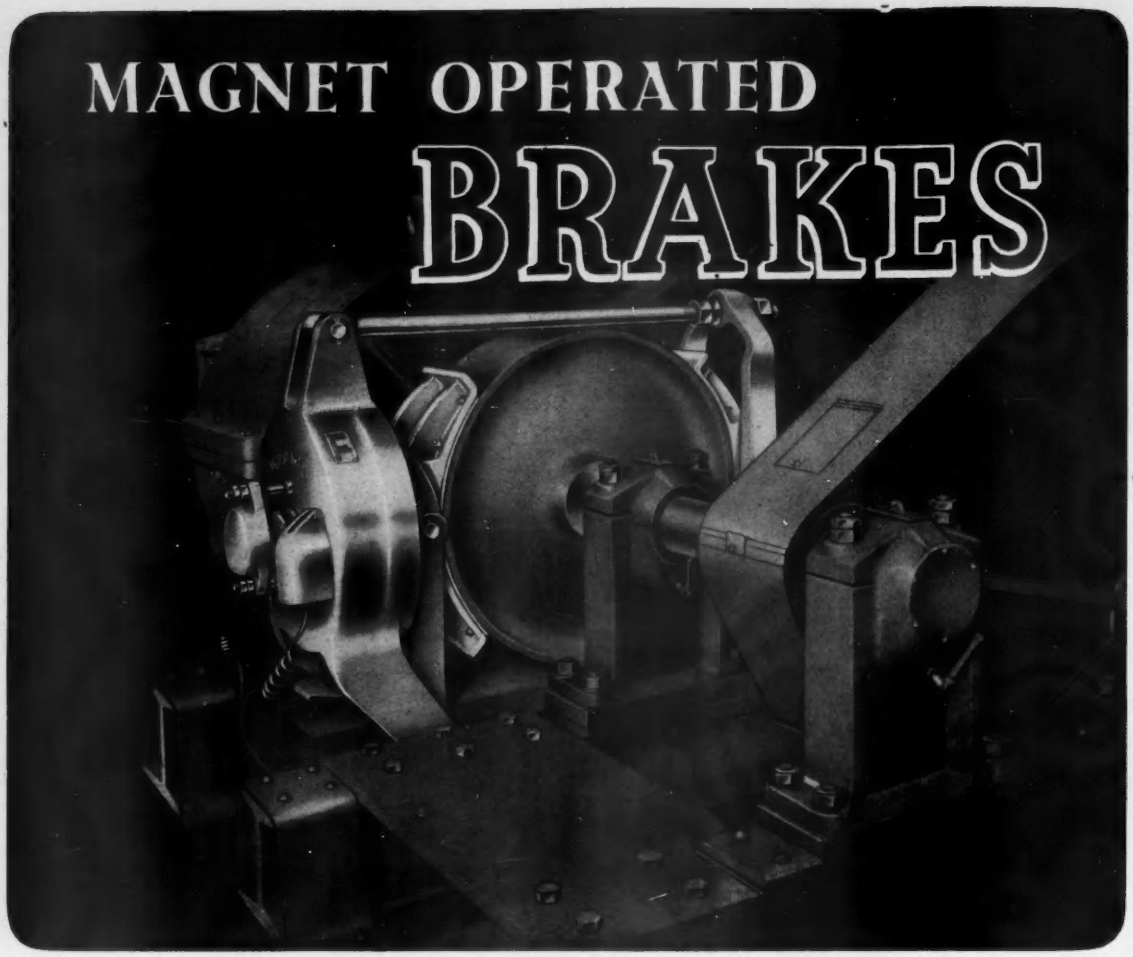

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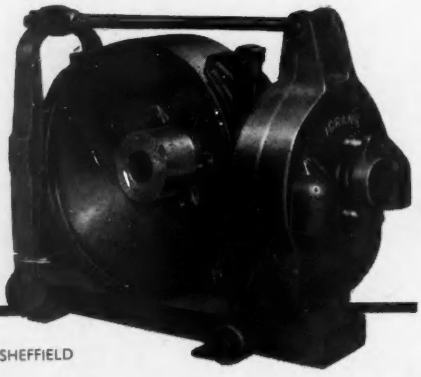

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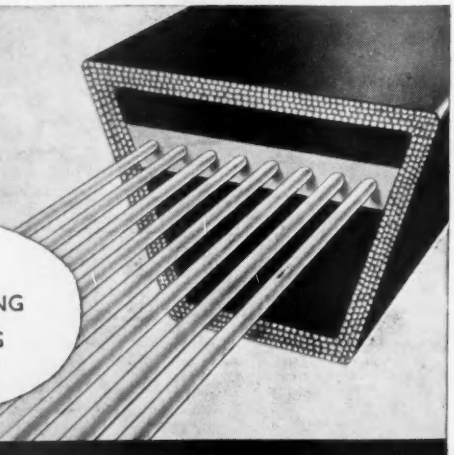

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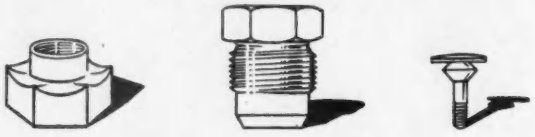

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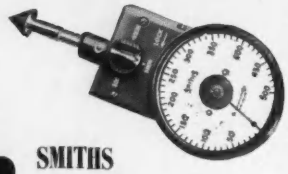

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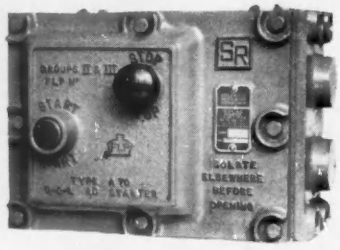

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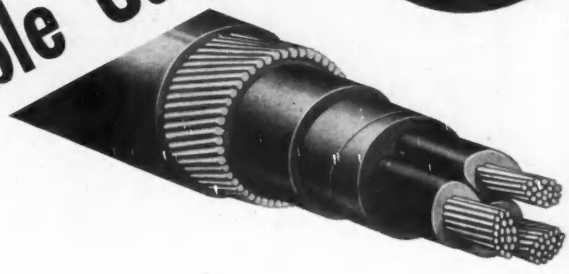

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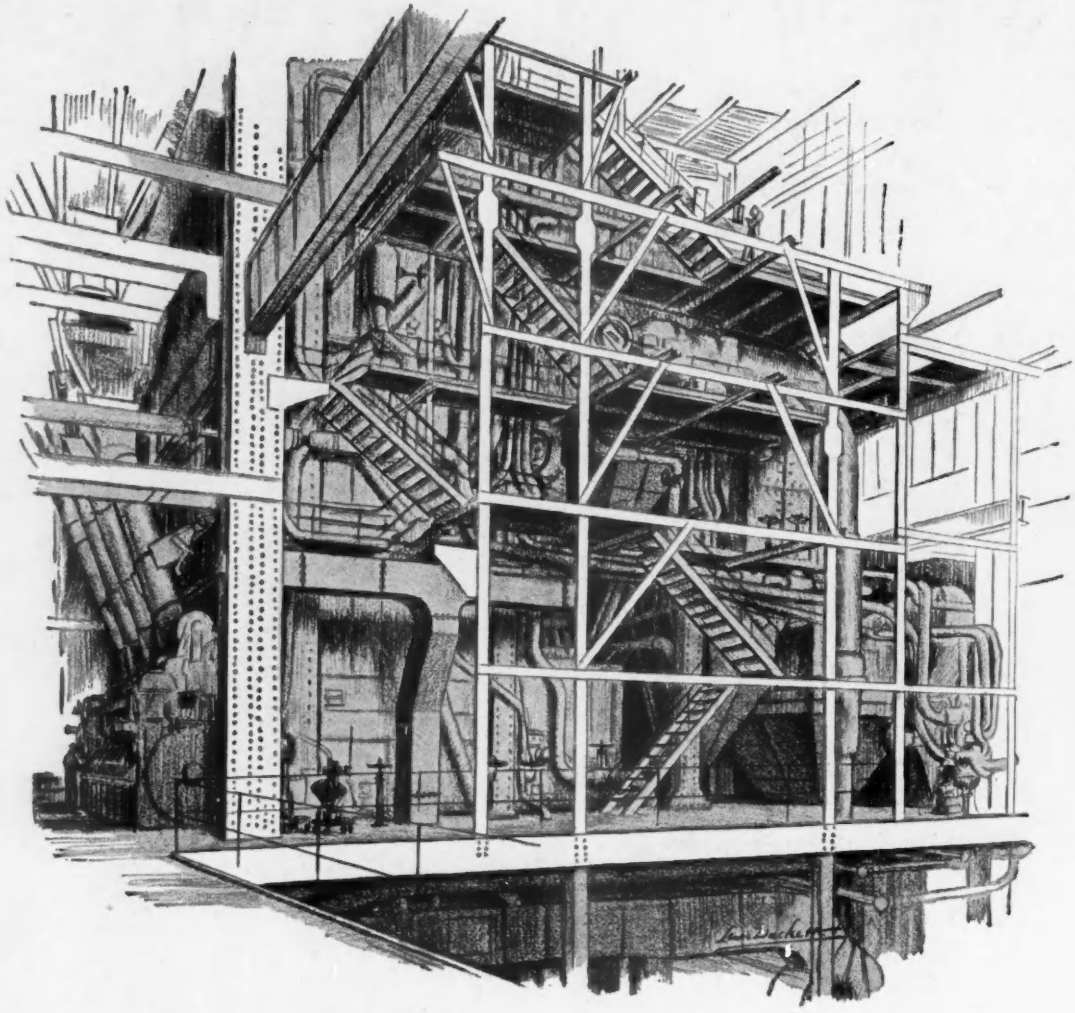

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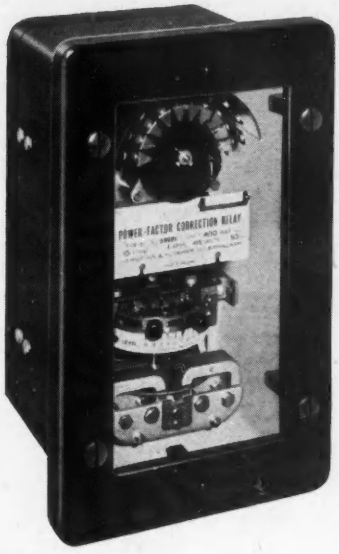

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The heavy duty silver contacts which control the condenser contactor operating coils, are both quick make and quick break, and are operated in succession when the kVAR exceeds the values pre-set on the relay.

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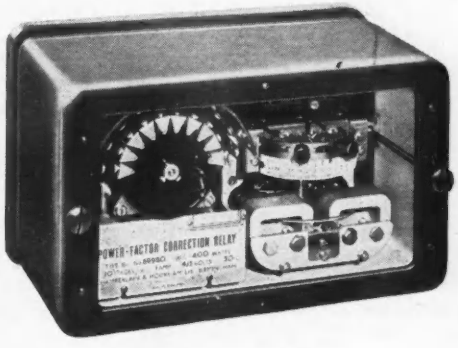
(above) Vertical mounted BPF relay housed in a flush fitting cover.

(right) Horizontal type BPF relay housed in projecting type of cover. Removal of cover does not cause dust to fall into the movement.



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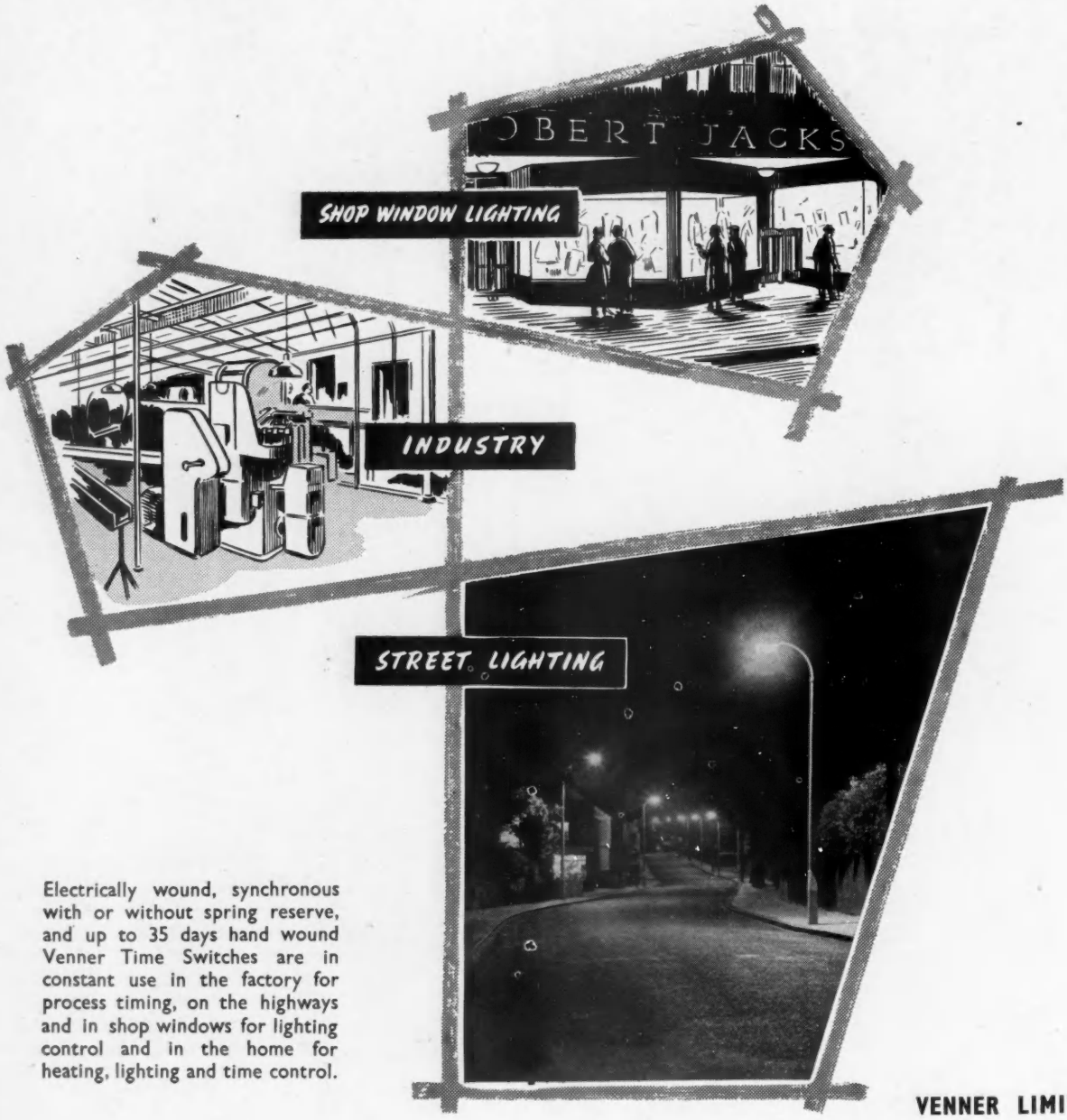

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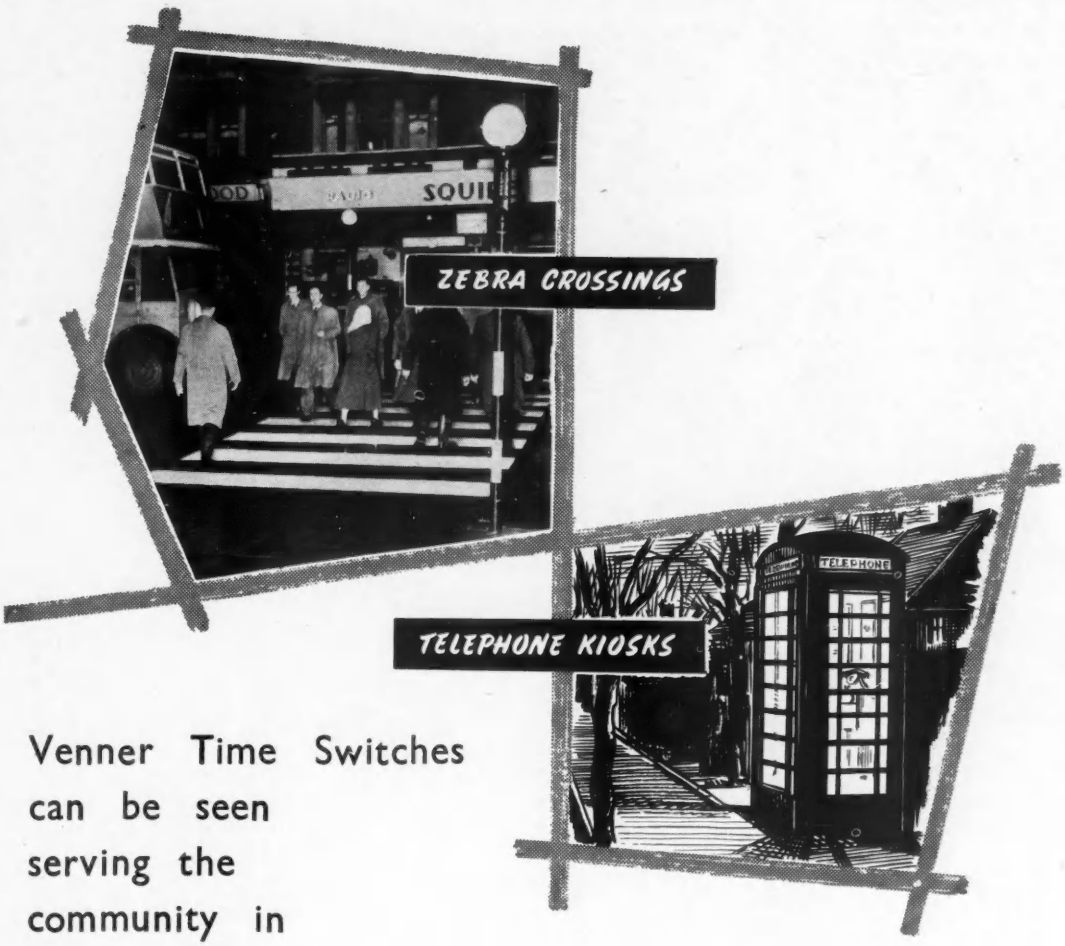

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(*Nathan B. Forrest)

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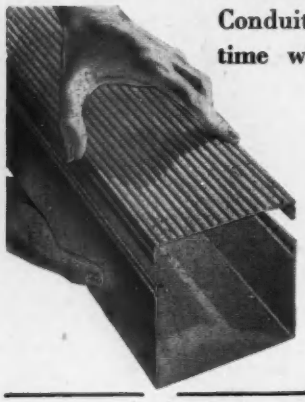

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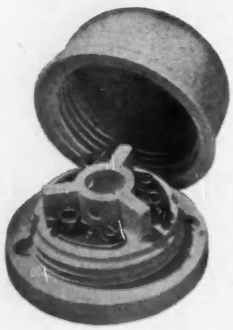

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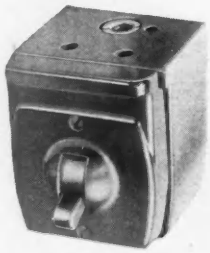

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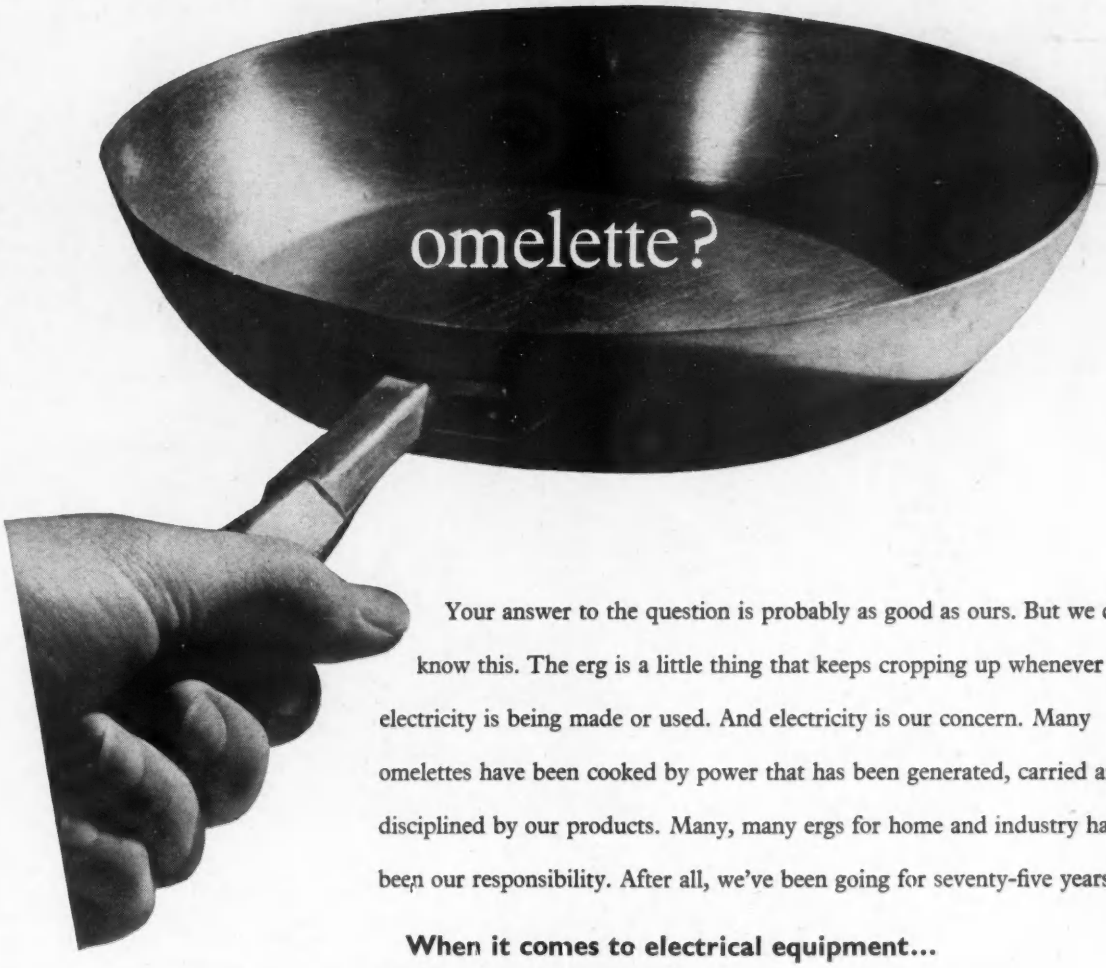

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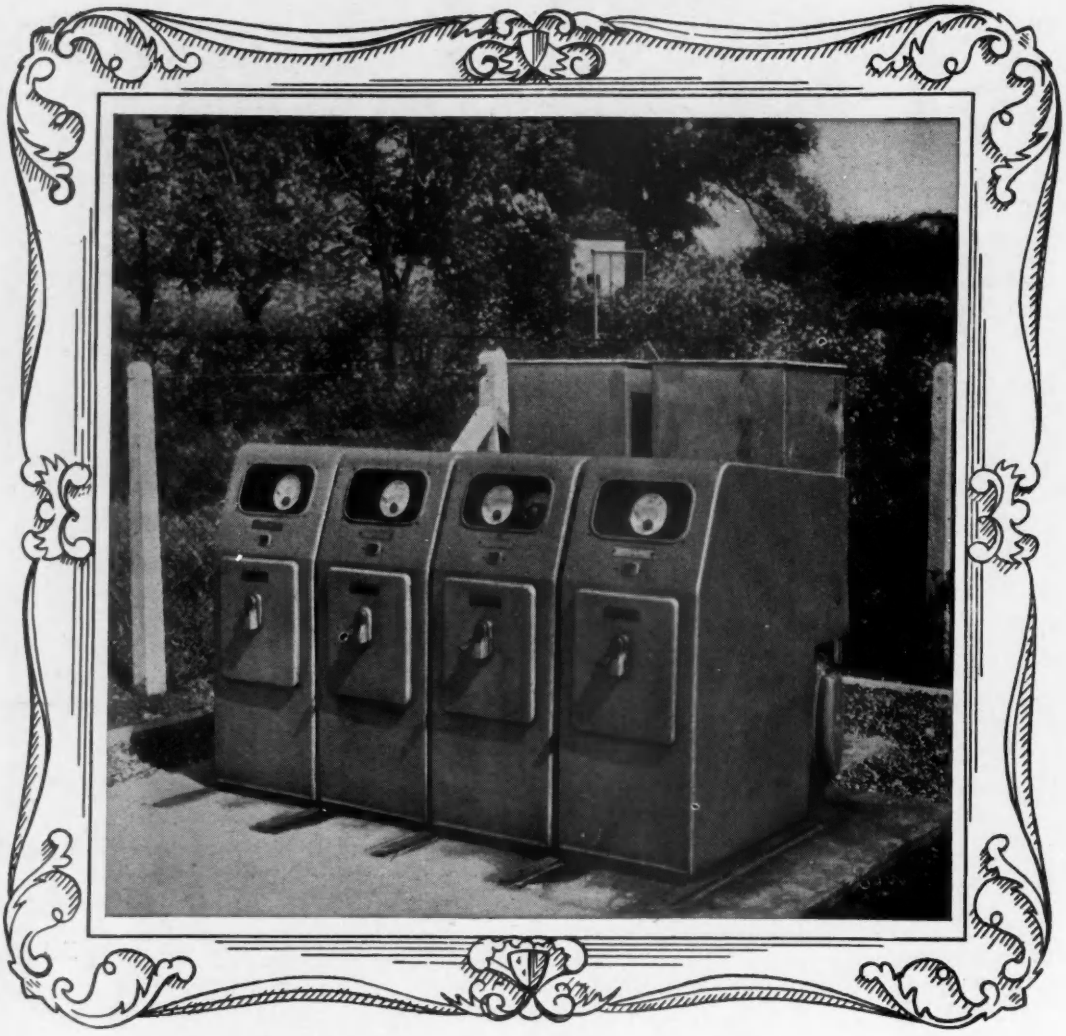

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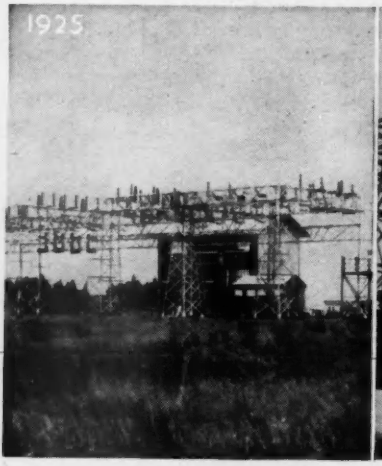

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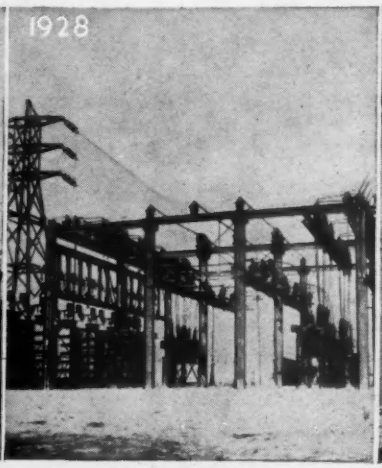

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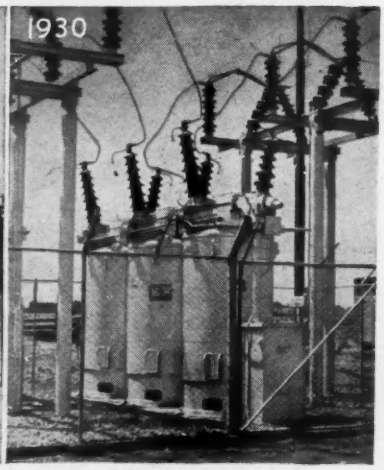

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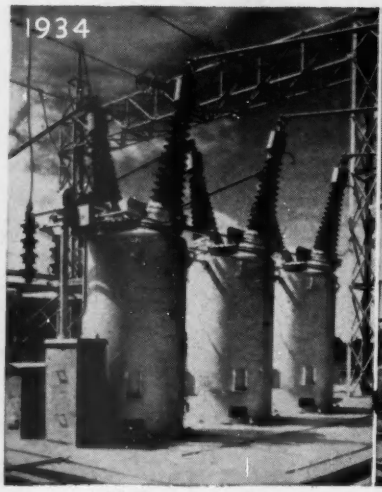

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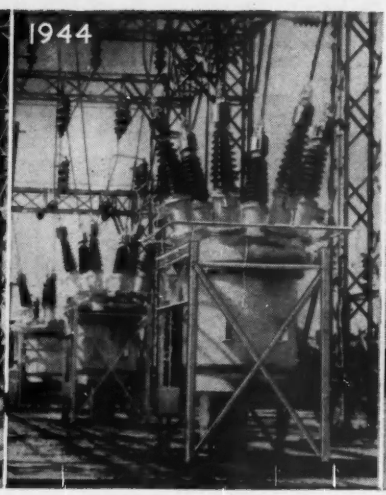

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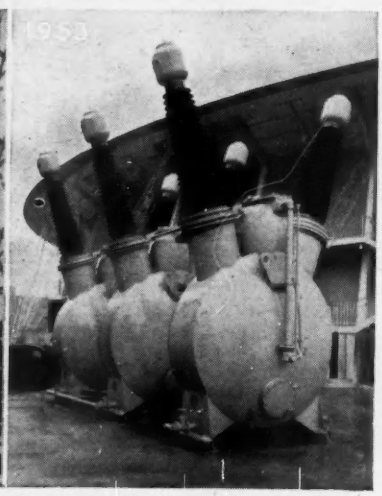

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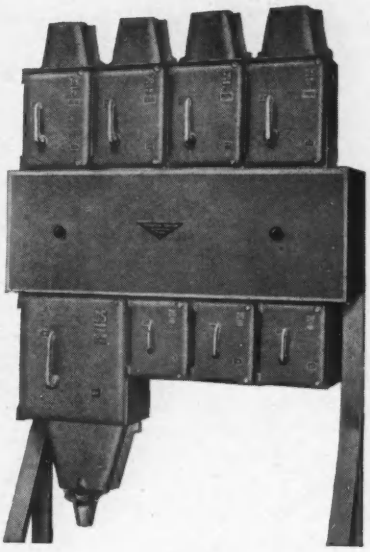

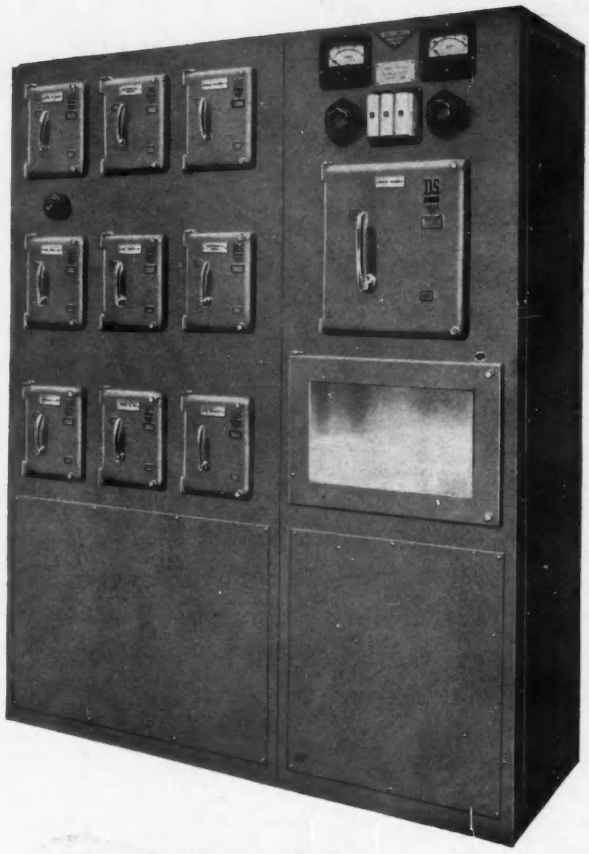

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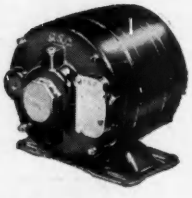

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DECENTRALISED DIVISION

Experiments in supply industry structure seem plentiful today. With the Scottish Bill still before the House, this week it is the turn of the generating side to come under the light of reorganisation with the setting up of an awkwardly named North Western, Merseyside and North Wales division to embrace two existing divisions. The Authority in announcing this change, states the purpose is "to obtain experience in the working of a larger unit than the existing divisions." However, the new division will still remain second in generating capacity to London, though the larger geographical area presents its special administrative problems. Perhaps, a more accurate angle from which to view the proposed change, is that of according to the enlarged division increased responsibility, a step in line with the B.E.A.'s declared policy of decentralisation. The extent of this further devolution of authority is not easy to see, nor for that matter, why such an experiment could not be equally made in the case of an existing division. Unquestionably, the two divisions chosen will be the easiest of all to weld together not only because the bulk of the generating plant of the Mersey division is situated in a group adjacent to the North West, but because the controller has a personal knowledge of both territories. Such factors are unlikely to be present if this experiment is extended to other divisions, a possibility presumably contemplated by the B.E.A. in their desire for decentralisation. However, this desirable goal is not necessarily best achieved by regional control. There is equally a danger that large zonal kingdoms may be less effective in securing real on-the-job responsibilities than a single authority with a benevolent viewpoint.

CHEAPER ELECTRICAL EXPORTS

Steadily, year by year, the price of our electrical exports has gone up, a fact that has been consistently apparent in the calculations made in this office for our monthly Volume Index of Exports. Up to the beginning of 1953, there had been only one break in this unwelcome progress towards record prices; and that was the rather artificial drop occasioned by the 1949 devaluation of sterling. Last year, however, the tide turned at last, and figures that have now become available show that the industry had to make a substantial reduction in its export prices. This applies both to heavy electrical machinery and to those lighter products of the industry which are grouped as "goods and apparatus." The drop in prices, averaged over the whole field, was of the order of 7% calculated on the maximum reached. Without it the industry could hardly have met

the increasing competition to which it has been subjected, and still maintained its high record of export achievement. In some degree the reduction in prices has been helped by falls in the cost of raw materials: the official series of "index numbers of wholesale prices," although not directly comparable, illustrates this, the price of materials used in manufacturing electrical machinery being shown as 6% cheaper in 1953 than in 1952. Nevertheless, credit for fall in price must go mainly to the manufacturers. Had they not achieved it, the volume of electrical equipment exported would doubtless have been seriously reduced.

NO FUEL FACTS

It is three months since E.D.A.'s useful booklet "Facts about Fuel" was attacked in Parliament by advocates of solid fuel, and now it is no longer available; it has been discreetly allowed to go out of print. We hope, however, that this does not mean the end of all fighting propaganda, E.D.A. should be encouraged rather than downcast because two Members of Parliament dared to say "Bo!" to their production. Such opposition is to be expected: even one of our own articles was the subject of representation by solid fuel interests to restrict its circulation. Those with a faith in electricity have for the past few years been fighting a defensive battle without a single weapon of propaganda. That fight is continuing; is it still to be carried on without full help from authoritative bodies? Even the Minister in his Parliamentary reply to a question on this very booklet as good as gave a wink to the B.E.A. to continue with their active propaganda. Yet so far we have heard of no approaching new edition of this booklet nor of any new one to take its place. The need is urgent; there is so much ground to be recovered that it can only be done by counter attack and the secret of successful counter-attack is the speed with which it can be mounted.

COMPREHENSIVE HOUSE HEATING

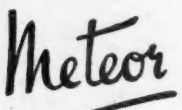
Electrical methods of domestic heating are usually judged by performance in a house designed for conventional open coal-burning fires: and even in these inherently adverse conditions, they prove attractive and convenient. What can be achieved when a house is purposely designed with electrical heating in mind is strikingly more impressive. All the expected and familiar benefits are emphasised: comfort, cleanliness, and freedom from troublesome chores, together with running economy, and to these is added an appreciable saving in capital cost. This latter advantage was shown in the 1930's when low-cost flats were being erected in the London Borough of St. Pancras, and now a sharply up-to-date demonstration is available as a result of experiments being made by the Burgh Architect of Inverness. For some while he has been investigating the possibilities of all-electric house heating by means of floor-warming techniques, and unfortunately for those whose task it is to decry electrical methods, he has carried out his tests the practical way, building a floor-heated house for himself, and subsequently four others for interested clients. The results underline the usually forgotten fact, that solid fuel heating is the most expensive in capital costs. No chimneys, fire places or coal bunkers have been needed in these new houses, and there has been a consequent saving of from £100 to £200 according to size. The thermostatically controlled electrical heating installation has absorbed only £69 to £117 of this saving. In all aspects, this Scottish experiment is a striking demonstration of the possibilities of electric house heating carried to its logical conclusion.

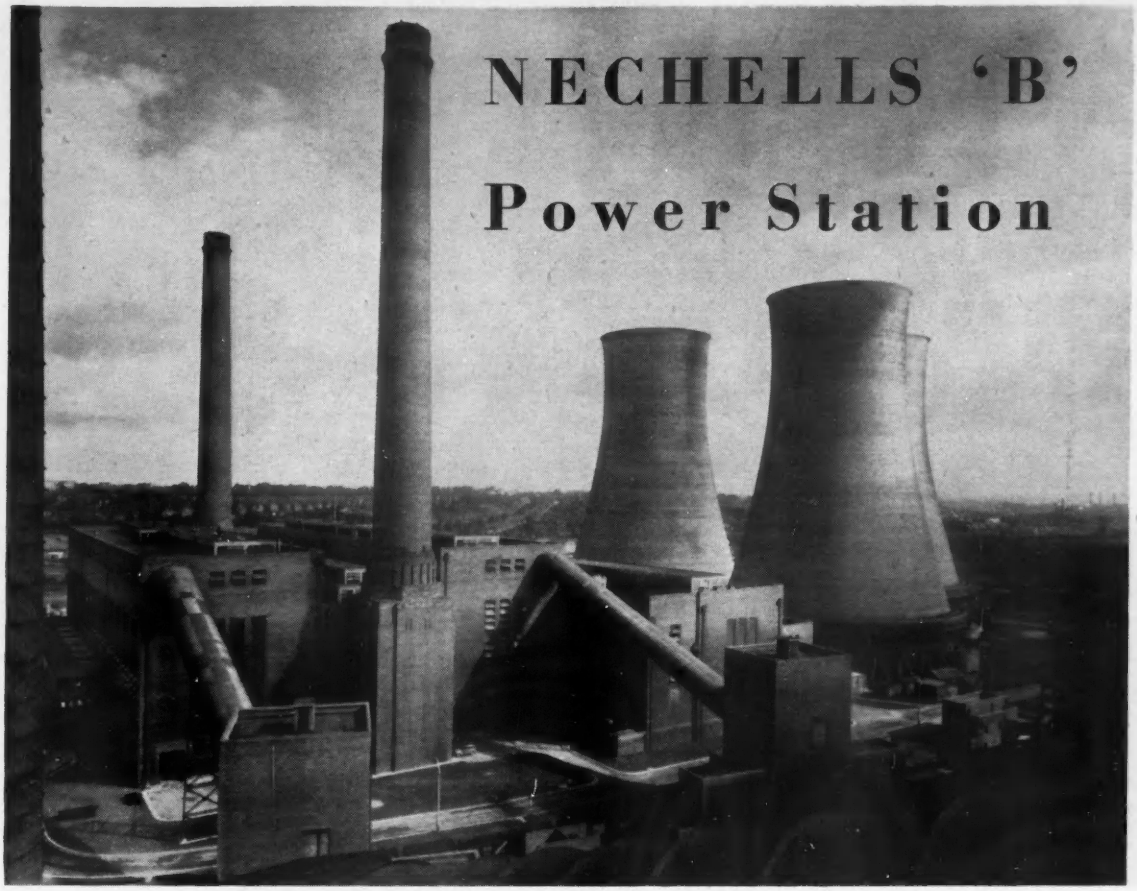
IDEAS FOR COURSES

Even when apprenticeships, national certificate studies and degree courses are finally left behind, there is still much for the engineer to learn. In particular he must assimilate the special knowledge of his selected branch of technology, and the techniques that go with it; text-books, the technical press and papers read before the various professional institutions are all there to help him. In addition to a growing extent in recent years, there has been a further channel of information, the advanced short course organised by some technical colleges and universities. These are often most successful: yet the feeling exists that the fullest use is not being made of them. In the opinion of the Advisory Council dealing with higher education in the London and Home counties area, the trouble is the lack of interest of industry. The argument is that since these courses are taken after the general training of the engineer is complete, they must cater for the needs for technological knowledge as demonstrated by day to day working. Although those responsible for organising the courses in technical colleges have close contact with local industry, they cannot have a well-defined idea of such requirements: to help them in their planning, they need suggestions from industry. Courses based on such suggestions are amongst the most successful, it is found; yet at present industry is not feeding in the ideas. Surely it should not be too much trouble to ask for what is wanted—especially when there is a good chance of getting it?

TRACTION FREQUENCY

By bringing its inner electrified section into line with outer areas, and taking its electric power supply at 50 c/s, the Southern Region of British Railways is making yet another advance in its exploitation of the possibilities of electric traction for operating a heavily loaded system. In the case of the 50 c/s regime now being introduced, the fullest use will be made of the possibilities of remote supervisory control and of mercury arc rectifiers. Special interest relates to the division of the total scheme of 71 substations between three different rectifier manufacturers, one supplying glass bulb rectifiers, and the other two, steel tank designs. Similarly, two different types of high speed d.c. switchgear will be in use, and since in each case the different designs will be operating in well defined areas under similar conditions, there should be an interesting tale to be told eventually of comparative performance. One further feature of the scheme, which is surveyed on a later page, demands special mention. For once the essential electrical part of the work is not approached or exceeded in cost by the incidental civil engineering. Only £1¾m of all this £11½m project, now well on its way to completion, is allocated to civil engineering.





NECHELLS 'B' Power Station

THE Birmingham area, due mainly to the initiative and foresight of the former Birmingham Corporation Electric Supply Department, is well endowed with local power. The Hams Hall "A" and "B" Stations are well known to the electrical power industry, and to the many visitors to the Castle Bromwich B.I.F., who travel from the City centre by road, the Nechells Station is a conspicuous landmark. For the past few years, these visitors will have seen rising on the north side of the old station with its unmistakable group of wooden type cooling towers, a new plant—Nechells "B." This project was initiated by the former Birmingham Corporation Electric Supply Department under the then Chief Engineer and Manager, Mr F. W. Lawton, M.I.MECH.E., M.I.E.E., A.C.T.C.(BIRM.). It was carried on after nationalisation very largely by the same constructional staff. The station is now in almost full operation—the last two boilers have yet to be commissioned—and is now under the control of the Midlands Division of the B.E.A. with Mr R. L. Batley, O.B.E., A.M.I.MECH.E., as the present Divisional Controller.

In some ways the station is unusual, having been designed with an eye to local conditions, and for the maximum economy in operation in the light of those conditions. The first major factor is the presence of a heavy industrial load. This is so great that virtually the total output of this 210 MW station can be absorbed by industry within a small radius of the site. Such a site must naturally be somewhere near the City centre and in this case it is located in an area some two miles from the City centre, close to the Nechells and Saltley works of the West Midlands Gas Board and on land part of which originally belonged to the Tame and Rea District Drainage Board.

One other factor had a major influence on the design of the Nechells "B" Station. Relatively large quantities of coke dust were available from the local gas works and as this is normally almost a commercial waste product and therefore cheap in comparison with coal, it was decided not to use pulverised fuel, which has become almost standard in these days, but to install chain grate stokers burning a mixture of coal and coke dust. The original intention was to use a mixture of four parts of coal to one of coke dust, but in practice it has been found possible to burn satisfactorily a larger proportion of coke dust. The result of the efficient and successful use of this fuel is that Nechells "B" shows a remarkably low cost per unit generated.

Apart from the saving in capital expenditure occasioned by not installing pulverised fuel equipment with its usual attendant electrostatic precipitation plant to prevent the deposition of fine ash on the residential and commercial property surrounding the site, there is a further beneficial result from using chain grate stokers. Ash from a pulverised fuel plant is difficult to dispose of at an urban site, restricted in area and with no ash dumping space in the immediate vicinity; stoker grate ash is a usable by-product. In the Birmingham area there is a demand for such coarse ash for use in making up road foundations and other civil engineering works and as a result of this demand the station is able to dispose of ash for these purposes fairly favourably instead of its being merely an expense.

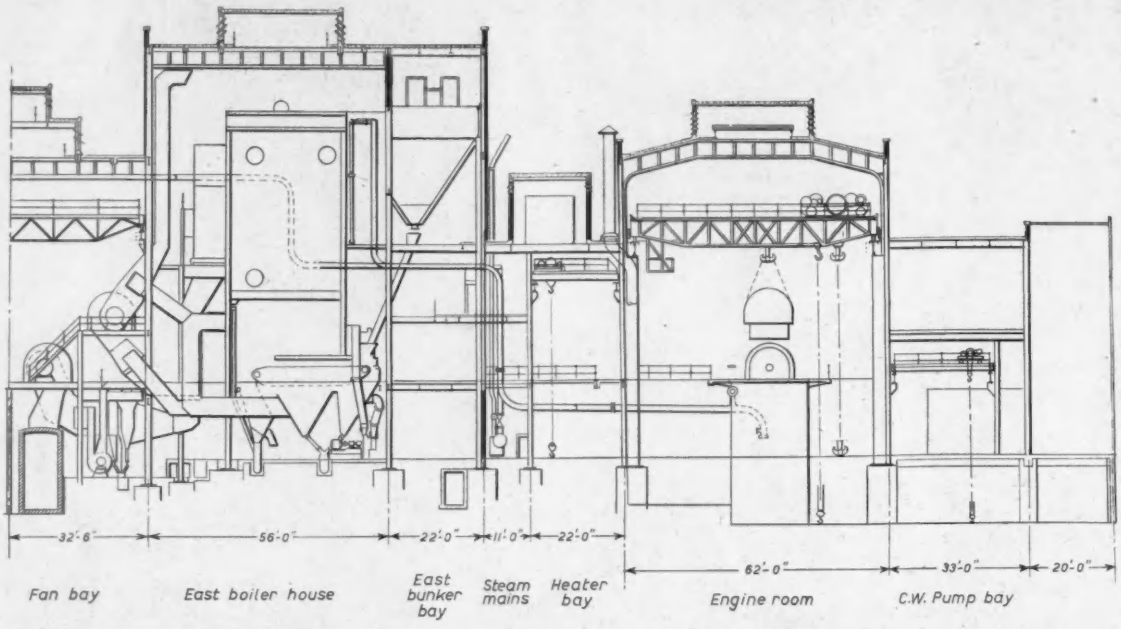


Fig. 1. Cross section of the station building, terminating at centre line of fan bay, and thus omitting West boiler house, which is similar to the East boiler house but which is, of course, to opposite hand

Station Construction

The station itself is a steel framed structure with the whole facing area of the building in brick. In view of the nature of the ground, piling had to be adopted for all foundations of the building, turbo-alternators, boiling and cooling towers. A total of nearly 7,000 reinforced concrete piles, each 14 in. square and up to 25 ft long were used in the construction of the station.

As can be seen from the cross-section of the station shown in the accompanying diagram (Fig. 1), the boiler house consists of two rows of boilers, separated by a fan bay, with the two firing aisles located on the outside of each row of boilers. Adjacent to the innermost boiler aisle is the turbine room—without any intervening partition—and then again is the circulating water pump and switchgear bay. The main offices and switchgear are in a block which is shown on the extreme right of the drawing. As also can be seen from the diagram, the main flues for the boilers pass below the floor of the fan bay, and this arrangement permits of a chimney at each end of the station, centrally disposed between the two boiler houses.

In the turbine room, the machines are in line and arranged symmetrically about the centre line of the station with the alternator end of each machine adjacent to the steam end of the following set in each half of the building. The turbine operating floor is carried the full length of the station with extensions to the wall on the one side to provide a convenient annexe for the turbine gauge board, and on the other side to give access to the boiler house. An interesting feature is the use of fabricated plate girders for the support of the turbine house roof.

Boilers

Each of the twelve boilers, manufactured by International Combustion Ltd., has an output of 230 klb/hr at full load, the steam conditions being the comparatively moderate ones of 675 lb/sq in. at 850°F. As mentioned previously chain grate stokers are used, and it is believed that these are among the largest boilers, taking into consideration the pressure and temperature, to be made for this form of firing in recent years. The boilers are of the radiant type, each unit comprising radiant boiler, superheater, economiser, air heater, stoker, draught plant and dust collecting plant. The stokers are of the twin "L" type, 32 ft wide and 22 ft long, set in a "Lopulco" fin tube combustion chamber. Steam temperature control is by means of a gas by-pass damper.

Boiler Auxiliaries

As we have already mentioned, the two lines of six boilers each are separated by a fan bay shown in Fig. 1. In this bay are located unit type mechanical centrifugal dust extractors and all the induced and forced draught fans together with their driving motors. This plant is located on two levels, the forced draught fans being mounted on two galleries running the length of the station behind the boilers, and the induced draught fans at the firing floor level. The forced draught fans are direct driven by 200 h.p. variable speed a.c. commutator motors and the induced draught by 193 h.p. motors. Speed control of all these motors is exercised by induction regulators. There are two induced draught fans, two forced draught fans and two secondary air fans for each of the boilers, the secondary air fans being located at basement level, below and at the front of each boiler.

The boilers are necessarily on the range system, and the steam receivers are situated in the basement on the turbine side of the boiler house. It will be seen from the diagram, Fig. 1, that this arrangement makes for what may seem a rather long steam pipe run from the remote boilers. Nevertheless, temperature and pressure drops are not excessive, the rated figures for the turbine steam chest being 650 lb/sq in. at 825° F, representing an allowance of 25 lb/sq in. drop and 25° F—quite conventional figures.

The feed water pumps are located in the basement of the turbine house between the foundation blocks and the boiler house, and two units are provided per set, one steam turbine driven and one powered by an 880 h.p. motor.

These pumps and motors were made by Mather and Platt Ltd. Four stages of feed heating are employed, the final feed temperature being 357° F.

Turbo-Alternators

Four Parsons 52·5 MW turbo-alternator sets are installed, each consisting of a three-cylinder tandem machine with twin exhausts, driving at 3,000 r.p.m., a 50 MW main alternator and a 2·5 MW auxiliary alternator. The main alternators generate at 11 kV while the auxiliary machines generate at 3·3 kV.

Cooling air for the alternators is provided by fans built in to the foundation block and operating on a closed circuit. The air coolers themselves are supplied with water taken from the circulating water system. Excitation is provided both for the main alternator and auxiliary alternator by means of a separate exciter set located alongside the alternator foundation in the basement. This set consists of a slip-ring induction motor driving the combined main and auxiliary exciters for the two machines. (Fig. 8.)

Auxiliary Electrical System

E.E.C. duplicate bus-bar 3·3 kV 150 MVA air break switchgear controls the outputs of three 6,000 kVA Station Transformers on the rear bus-bars and the four 2·5 MW auxiliary alternators on the front bus-bars. The auxiliary alternator couplings are so arranged in relation to the main alternator rotors that the auxiliary alternators can be paralleled with the works transformers as the main machine is brought up to load and also when load is reduced prior to shutting down. The range of loading of the main alternator at which this operation can be carried out is sufficiently wide so as to prevent any difficulty in operation. Consequently the auxiliaries are first run up on the station bars and then transferred to the auxiliary alternators by switching via the bus-bar coupler circuit-breakers. Thus, operation of each set can be regarded as being on the unit principle. Control of the supplies to the auxiliary boards, including synchronising of the supplies, is carried out from the main control room.

The larger auxiliary motors operate at 3·3 kV and are

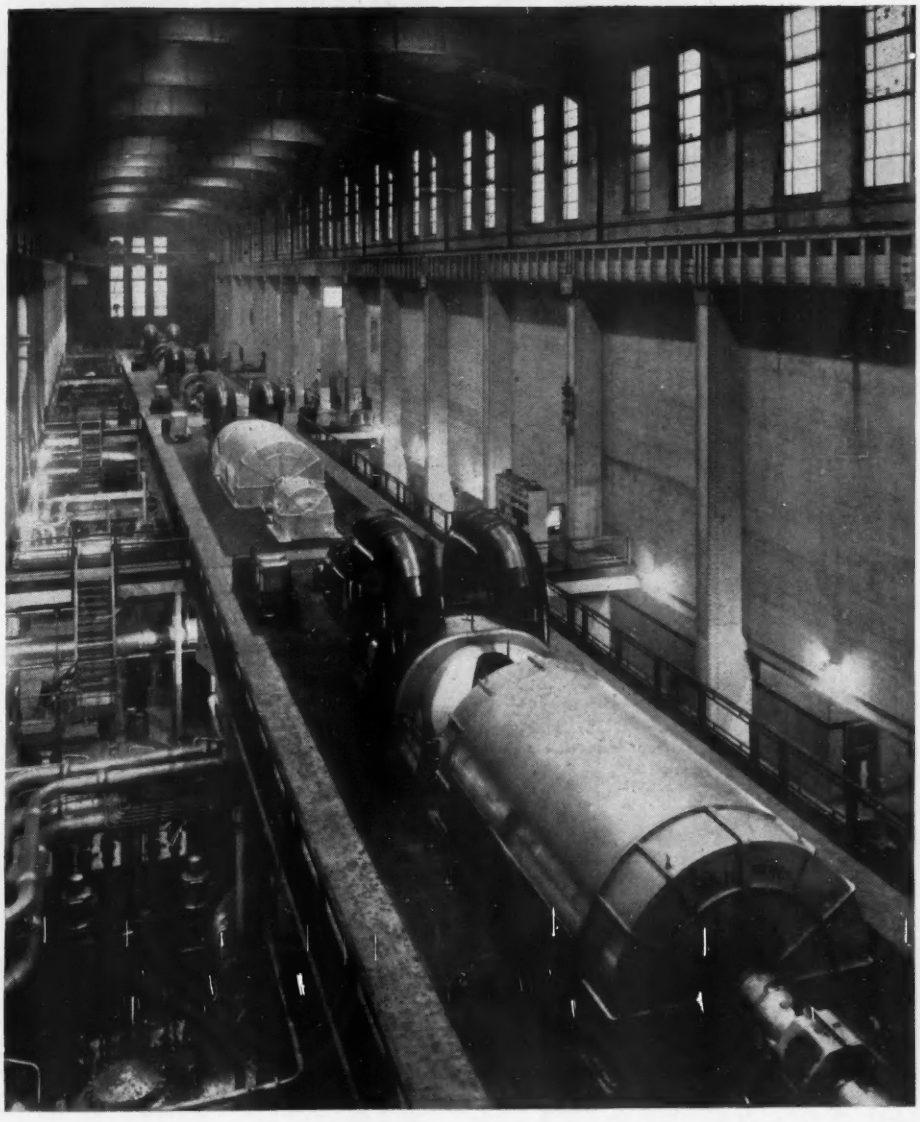


Fig. 2. This view of the turbine hall at Nechells "B" viewed from the crane gallery level gives a clear picture of the layout of the four machines

switched from suitably disposed local control panels adjacent to the main plant items. All large motors are of the slip-ring induction type with oil immersed rotor starters with the exception of the variable speed boiler auxiliaries which are of the a.c. commutator type with induction regulator speed control. Smaller auxiliaries, lighting and general services are controlled from 415 V single bus-bar 25 MVA air break switchgear.

Main Electrical System

The electrical system of the station is somewhat complex for two reasons. First, the original design was drawn up by the Birmingham Corporation Electric Supply Department when both generation and distribution were under unified control. Under these circumstances and in view of the heavy local load, the station was designed to feed directly into the local 11 kV network. Thus, the station houses both Divisional and Area Board plant. Second, the station was designed to supersede the old Prince's Station, at Nechells—now known as Nechells "A" —but the shortage of plant generally made it essential to keep the "A" station running and considerable ingenuity was required to modernise and re-cable the existing switchgear without loss of output from the "A" station during construction, and to retain five of the "A" station machines in service.

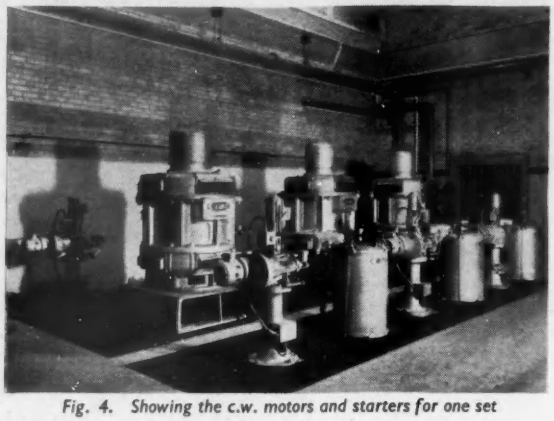
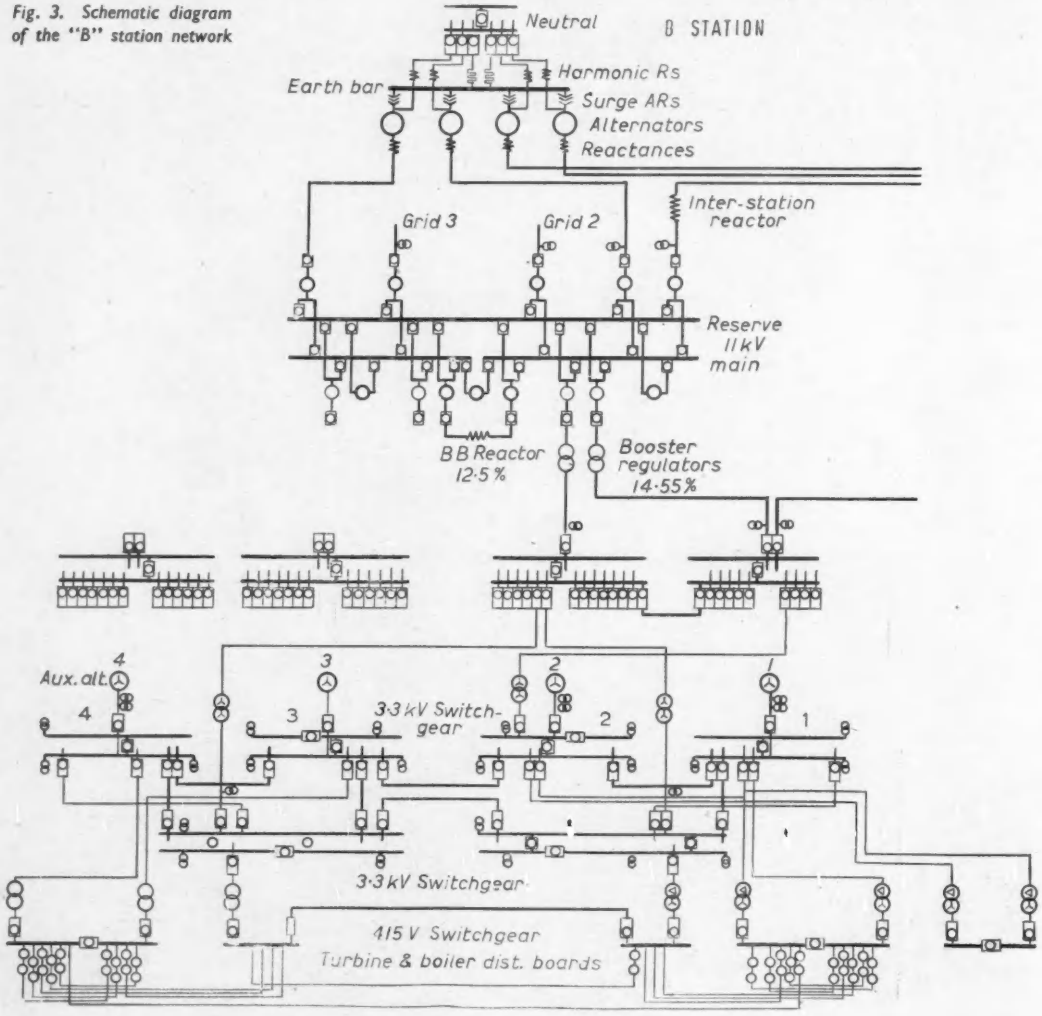


Fig. 4. Showing the c.w. motors and starters for one set

The main 11 kV switchgear controlling the output of the first two machines comprises two groups of the existing G.E.C. cellular gear located in the "A" station, which has been uprated to 1,000 MVA while the switchgear control-

Fig. 3. Schematic diagram of the "B" station network



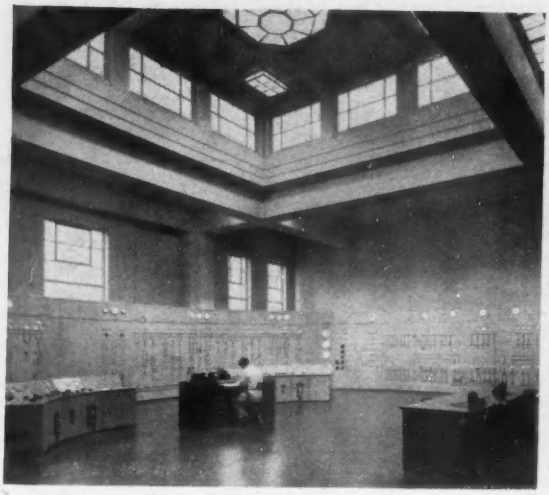


Fig. 5. The spacious control room

ling the third and fourth machines comprises two groups of G.E.C. metalclad gear, also of 1,000 MVA rating and located in the new "B" station building. This necessitated the construction of a cable tunnel between the new "B" station and the existing cable tunnel in the old "A" station. Longitudinal and cross cable tunnels suitably segregated provide ready means of internal cabling, but cable ducts were necessary to pass existing sewers and drains encountered on the tunnel interconnecting the "A" and "B" stations, and also the tunnel between the "B" station and the nearby grid substation.

As will be seen from Figs. 3 and 6, extensive use of reactors was necessary to limit the fault power on the main bus-bars and also on the Area Board distribution gear. This latter gear is divided into five groups in the existing "A" station and, at present, two groups in the "B" station. The new distribution switchgear is of 250 MVA rating and that existing in the "A" station has been suitably uprated. Each of the seven groups is fed from the main bus-bars via 30 MVA booster reactors with automatic voltage control and one group in the "A" station comprises a standby bank to the other six groups.

The arrangement of the circuits of the four auxiliary alternators can also be seen from Fig. 3. It should be noted that the four connections from the "B" to the "A" station are the cables which have been installed in the tunnel mentioned above.

Ash, Coal and Water

Although the station has officially a coal storage capacity of some 50,000 tons, the situation at the moment is such that with the "A" station still in use a temporary storage area is being used, as the storage area designated is that at present covered by the old wooden cooling towers. Four wagon tipplers are provided, one pair for each of the boiler houses to convey rail-borne fuel to the belt conveyors and thence to the bunkers. Ash is removed by water sluice and taken to settling basins. From these it is grabbed and discharged to overhead hoppers for removal from the site by railway wagons or lorries.

Three large hyperbolic concrete cooling towers each capable of handling 53,300 gallons per minute are located on the turbine room side of the station. Make-up for the cooling water system is taken either from river or from the adjacent canal. There is no separate pumphouse for

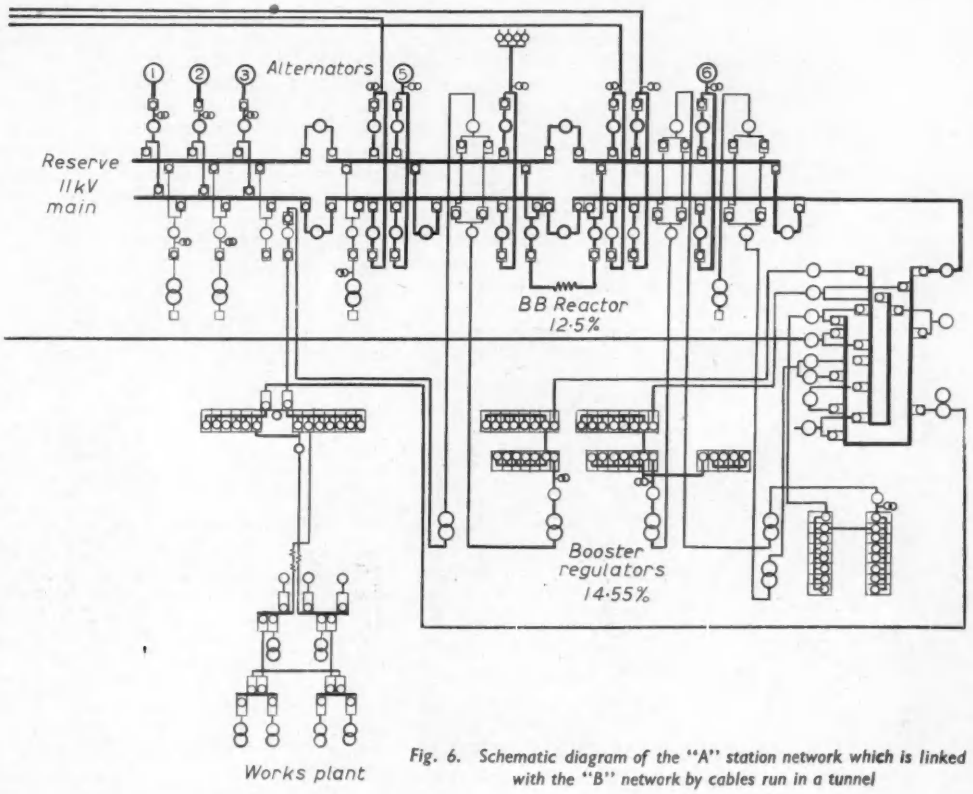


Fig. 6. Schematic diagram of the "A" station network which is linked with the "B" network by cables run in a tunnel

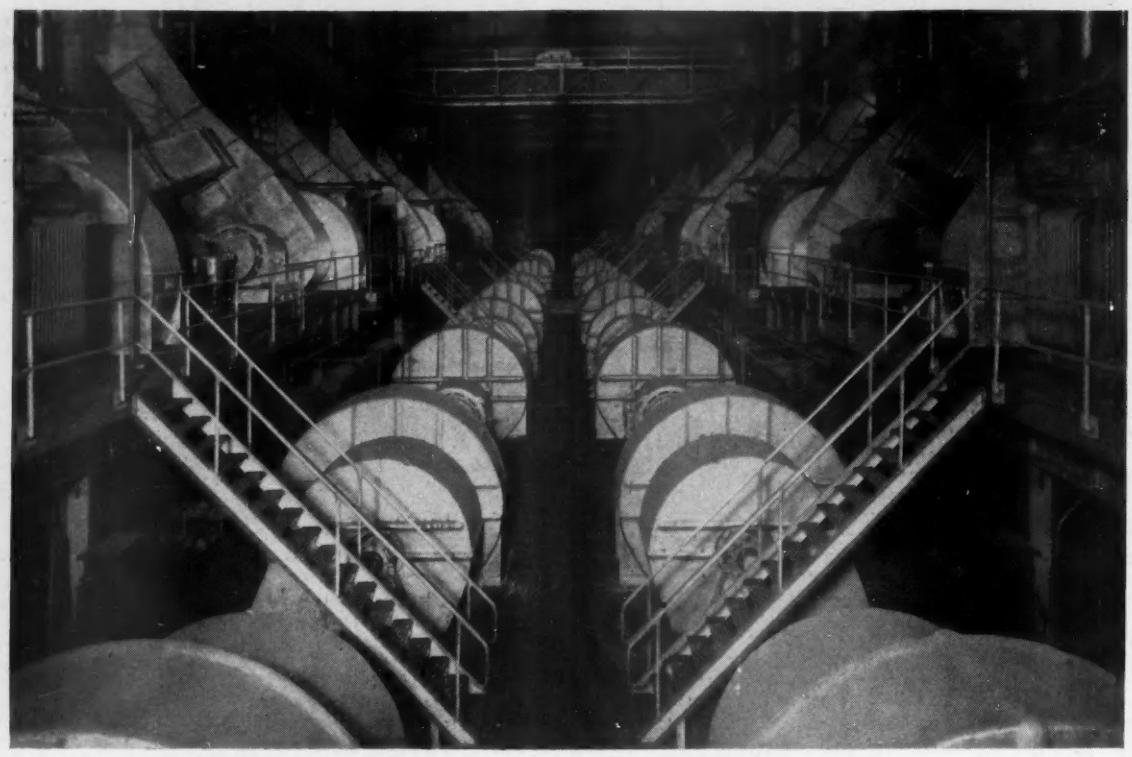


Fig. 7. View down the fan aisle which runs along the centre of the boiler houses

circulating water pumps, each set having a group of three pumps located in annexes in the station basement. These pumps are of the vertical spindle type and are each powered by 580 h.p. motors. The pumps themselves are by Mather and Platt Ltd., while the motors are by the British Thomson-Houston Co., Ltd.

Main Control Room

The control room, shown in Fig. 5, is particularly light and airy having a high percentage of natural light available both from the skylights and windows. This control room accommodates the control of the four groups of main 11 kV switchgear, the control of the adjacent 132 kV grid substation interconnected with the generating station via three 45 MVA transformers, the control of station auxiliary supplies as previously indicated, together with control of the seven groups of distribution switchgear. A separate control desk accommodates load and voltage control for the machines, grid transformers and group feeder booster reactors, but all switching and synchronising is carried out from the appropriate main control panels.

Our thanks are due to the Divisional Controller of the Midlands Division for allowing us to visit the station and for the illustrations.

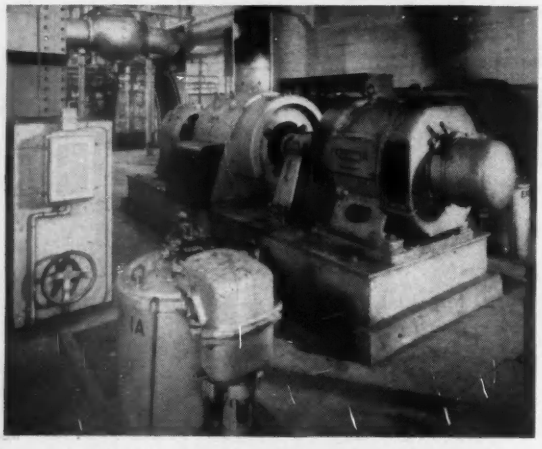


Fig. 8. The exciter sets and starters in the basement

List of Main Contractors

Building foundations.	Sir Robert McAlpine & Sons (Midlands) Ltd.
Main Building superstructure.	C. Bryant & Son Ltd. and E. C. & J. Keay Ltd.
Cooling Towers and Ponds.	Fred Mitchell & Son Ltd.
Brick Chimneys.	P. C. Richardson & Co. (Middlesbrough) Ltd.
Flue Gas Ducts.	Horseley Bridge & Thomas Piggott Ltd.
Turbines, Alternators, Condensers and Feed Water heating plant.	C. A. Parsons & Co., Ltd.
Steam and Feed Pipes.	Stewarts & Lloyds Ltd.
Boiler Plant.	International Combustion Ltd.
Circulating Water Pumps and Feed Pumps.	Mather & Platt Ltd.
Circulating Water Pump Motors.	British Thomson-Houston Co., Ltd.
Feed Pump Motors.	Mather & Platt Ltd.
Boiler Fan Motors and Regulators.	Laurence, Scott & Electromotors Ltd.
Coal Handling Plant.	Mitchell Engineering Ltd.
Ash Handling Plant.	International Combustion Ltd.
Overhead travelling cranes.	Sir William Arrol & Co., Ltd.
Circulating Water Valves.	Alley & MacLellan Ltd.
High Pressure Valves.	Hopkinsons Ltd.
Low Pressure Valves.	Alley & MacLellan Ltd. and J. Blakeborough & Sons Ltd.
11 kV Switchgear.	General Electric Co., Ltd.
Interbus Reactors.	British Thomson-Houston Co., Ltd.
Generator Reactors.	C. A. Parsons & Co., Ltd.
Booster Reactors.	British Electric Transformer Co., Ltd.
3,300 V and 415 V Auxiliary Switchgear.	English Electric Co., Ltd.
Cables.	B.I. Callender's Cables Ltd.

READERS' VIEWS

Correspondents writing under a pseudonym are asked to submit their names in confidence to the Editor

Earth Wires to Motors

IN your issue of 11th February under the above heading "Megohm" states "not every motor Manufacturer provides a suitable earthing terminal on his motors" and suggests that the earth wire must either be connected to the holding-down bolt or to the terminal box bolt. I disagree with the suggestion to use the holding-down bolt. My experience has been that where motors are operating on slide rails the holding-down bolts, after making adjustments to the belt drive, have sometimes been left loose and the earth connection practically useless.

I have always arranged to use, in such cases, one of the end-shield bolts. Where large bolts are in use a piece of tinned copper strip $\frac{1}{8}$ in. thick, the length and width, of course, depending upon the size of bolt, is easily fitted and to which the earth wire is connected.

With regard to the earth wire being run inside or outside the flexible conduit, I would say the correct position *always* is outside the flexible conduit where the earth wire is "visible" and the earth terminals can be easily inspected.

T. Simmons, A.M.I.E.E.
BIRMINGHAM 20.

The Female of the Species . . .

. . . who is wedded to the male.

Good Sirs,
In answer to John Hanchard Goodwin
I beg to be allowed to say a word
FOR THE DEFENCE.

Much as I did enjoy
His mordant wit and most mellifluous phrases,
I must deplore
His disregard for justice.
In the Courts of Law
It cannot be admitted evidence
That which "the soldier said"—
Your correspondent
Lets lack of logic lead him to conclusions
Based on events to which he was not witness,
(As he admits)
And therefore cannot swear they ever happened!

Now, this leaves me
Like Elephant's child in Rudyard Kipling's story—
A little warm, but not at all astonished.
Ever since Eve
MAN has found WOMAN a convenient scapegoat
For all his follies,
All his faults and failures,
Let them be moral, social—or electric.
Woman, what e'er her whims,
Knows there are things she does not understand.
But "man, proud man,
Drest in a little brief AUTHORITY"
(Perhaps not even BRITISH or ELECTRIC!)
Insists on taking everything to bits
To see what makes it tick
Pray don't misunderstand me;
Your correspondent doubtless is an expert

But there are others—
By festoon'd flex and cables under carpets,
How very well we know them!—
Who think that they know better than the experts
Such an one
Is ever buying gadgets
Which he plugs in to over-loaded points,—
Blowing the fuses,
Setting things on fire,
Losing his tools—losing his temper, too—
Leaving behind him
Small screws and bits of wire in deep-piled carpets,
From whence, unseen, they creep into the cleaner,
Fouling the works,
And woman gets the blame.

The other morning
My husband stood UPON A TROLLEY-TABLE
To fix the light that failed.
It skidded 'neath him;
Snap! went the flex,
Something was disconnected
Within the wiring system, and he slipped
One of those disc-things in his spinal column.

And yet I am expected to be grateful;
Not this alone—
When, having found his efforts are abortive,
I quietly effect repairs myself,
I must not speak,
Lest I shake faith in his omnipotence.

Unlike John Hanchard Goodwin,
I have but one experience of marriage;
If Heav'n be kind, I'll never have another.
I love him dearly,
But, times, I feel with Mrs Gaskell ("Cranford"),
MEN IN THE HOUSE are rather in the way.

Christine Walters.
BARNEHURST,
KENT.

Books for Productivity

YOUR editorial comment on the need for technical libraries in industry (11th February) is timely. There is evidence to show that the establishment of such libraries is proceeding at a pace which, twenty years ago, would have been regarded as phenomenal, but there can be no room for complacency if it be conceded that at least 5,000 of the 55,000 industrial establishments in the United Kingdom could with advantage to themselves set up their own small technical libraries.

The medium-sized firms to which you refer, however—and I assume those with between 500 and 3,000 employees are envisaged—present a peculiar problem. They are neither small enough to count themselves out of the running for the systematic application of the results of research, nor large enough to convince their shareholders that the outlay and annual cost of a library—without which, in any case, reasonable profits have probably been

maintained in present trading conditions—represent a fair proportion of total expenditure for what is at first sight a non-productive function.

For such firms, two interim courses are worth considering. First, one person with sufficient technical knowledge and understanding of the firm's interests could be designated as the channel for obtaining technical information. His main function would be to exploit existing sources of information—Government departments and research stations, research associations, public libraries, scientific societies, trade associations, chambers of commerce and so on—to solve individual problems as they arise. The second course would be for a group of, say, half a dozen such firms to share the cost of a joint technical library which would initially hold the small number of reference books and technical journals of major interest to those companies and act as the channel for tapping the vast resources of the sources of information already mentioned. For this course, a reasonably compact and homogeneous industrial community—one thinks of Redditch or Coventry—would be ideal though not essential. In either case the cost per company would be small, but results should certainly lead within three to five years to consideration of the further development of an internal information service or technical library.

That the trend towards the establishment of technical libraries is gaining impetus is evidenced by the growth of the membership of this Association from 1,000 to over 1,600 in the last three years, and by the increasing calls made upon the Association for advisory and consultancy services by firms which have decided to start a library from scratch. The financial support which H.M. Department of Scientific and Industrial Research gives to the development of this work is an equally welcome sign that H.M. Government is fully awake to the value of the contribution—as yet only partially recognised by industry as a whole—which technical (and, of course, commercial) information has to make to industrial productivity.

L. Wilson, M.A.

DIRECTOR, ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUX, LONDON, W.8.

Status of the Engineer

I AM greatly indebted to Mr J. W. Thomas for his letter to you. He very carefully expands the issue I initiated and little thought is needed to find in it complete confirmation of my fears.

Any amalgamation, through a hybrid organisation such as A.M.E.E., must, I feel, soon result in nothing but ill for all its membership.

There is the very capable and powerful organisation called N.A.L.G.O. Its interests and experience are as eminently suited to the non-technical administrator as E.P.E.A. is to the technical.

Need I say more?

District Manager.

Cycle Lamp Voltages

BEING one of the many cyclists forced to venture out on the roads after dark, and consequently to use cycle electrical equipment, I have often wondered how the seeming illogical voltage ratings of cycle battery lamps ever came to be devised. Such lamps are rated at 2·5 volts, 3·5 volts and 6 volts, the former two are usually run from batteries whilst the higher voltage lamp is designed for operation from cycle dynamo lighting sets.

Considering only the two lower ratings, these have to be used in conjunction with either twin or single cells. The single cell, type U2, commonly used for rear lamps, has a terminal voltage of some 1·5—1·7 volts and hence the lamp is continuously under-run. When, therefore, the cell begins to run down, the rear lamp is dimmer than it need be if a 1·5 V lamp were available. Turning to the front lamp, the most frequently used battery is a twin cell, of voltage 3 to 3·4. Therefore the 2·5 volt lamp is considerably over-run when working from this source, and the 3·5 volt lamp under-run, with same consequences as with the rear lighting unit. Of course these remarks apply to all batteries made for pocket flashlights and similar uses—either one has to tolerate a dimmer lamp than need be, or burn out lamps at a greater rate than is necessary, and where cycle lamps are concerned, than is commensurate with safety. Surely there is some way in which these difficulties could be overcome?

Night-Rider,
LONDON, N.1.

CEREMONIES AT PORTSMOUTH

TWO interesting little ceremonies took place last Monday at Portsmouth power station. The first, the planting of a tree by Dame Caroline Haslett, was to mark the completion of the fourth extension of the station. Speaking at this first function Mr A. D. Matthews, station superintendent, gave the reasons for the formal ceremony. It was in addition to marking the "tidying-up" of the station, also to celebrate and commemorate the Coronation year. Unfortunately, tree-planting had to be carried out at the right season, and this was the reason for the delay. Replying, Dame Caroline expressed her great pleasure in being invited. It was, she said, the practice of the B.E.A. to plant out in new stations, but possibly not enough attention was paid to old power stations. It was most appropriate that the B.E.A. should provide these amenities in the form of a formal garden for the work people. By such methods could we try to give relief to some of the evils done in the industrial age.

The planting of trees and grass in industrial areas was in a way symbolic of the new clean age of electricity. The "Victory" was made of English oak, and one might say that in the past the trees and the greatness of the country had been bound up together. She congratulated the staff on the wonderful job they had done in the cold spell. The industry had gone far to restoring the public's faith in the continuity of electricity supply.

The second ceremony was the unveiling of a plaque, to commemorate the site of John Pounds' home. Mr R. H. Coates, Divisional Controller, pointed out that the station had absorbed a large section of Old Portsmouth. Among sites that had gone was the house of John Pounds, the Founder of the Ragged Schools. He emphasised the importance of education in the technical world, and in particular its importance to the electricity industry. The Lord Mayor of Portsmouth, Councillor Frank Miles, who unveiled the plaque, commented on the importance of John Pounds, particularly as a citizen of Portsmouth. It was somewhat ironic that the original house stood up to the "blitz" on Portsmouth, but when the frontage was removed to the basement of a museum for safety, a bomb was dropped which destroyed both the museum and the remains of the house.

The power station now covered a large area of what had been Old Portsmouth and he congratulated the B.E.A. on their thoughtfulness in including in the structure of the building a plaque which would commemorate for all time one of Portsmouth's greatest sons.

Southern Electric

Frequency Change

THE suburban system operated by the Southern Region of British Railways is generally accepted to be the largest integrated electrified railway system in the world. The complexity of the system derives largely from the rivalry between the various individual companies prior to the amalgamation.

Electric traction was introduced on the system in stages from 1915 to 1930. After the 1923 grouping, however, it was decided to standardise the voltage at 600 V d.c., and the system was divided into three sections for convenience of operation. Later the voltage was raised to 660, and in the modern scheme of replacement dealt with here, provision has been made for a possible future increase to 750 V.

Power for the suburban system was, prior to the war and indeed, during the war, obtained from 49 manually-operated rotary convertor substations, which were in turn fed at 11 kV, a.c. 3-phase 25 c/s power. On the Western Section, this power was generated at the Southern Railway's own power station at Durnsford Road, whilst the Central and Eastern Sections were supplied from the Deptford Power Station of the London Electric Supply Corporation. This station was originally constructed for the sole purpose of supplying the railway.

It had long been realised that considerable savings could be made by the use of unattended rectifier substations, taking power from the Grid system at 50 c/s, and in view of the fact that the rotary substations were reaching the end of their economic life, a basic plan for the replacement and reconstruction of the electrical distribution system was formulated during the war years. This included the conversion and extension of the Deptford power station to operate on 50 c/s. A certain delay in the putting into operation of the plan was, however, introduced by the nationalisation of the electricity industry and the railways, but now the scheme, one of the largest yet undertaken and involving the expenditure of some £11·5 millions, is well advanced.

Apart from the necessity to replace the out-dated rotary convertor substations, there were other important factors to be taken into consideration. Owing to the outer area electrification schemes, which in the rural sections are powered from the Grid 50 c/s supply, the number of electric trains—replacing steam trains—has increased considerably in the suburban area. Later this year ten-car trains will replace the existing eight-car units on certain routes in the Eastern Section, and in addition future plans envisage an extension of services.

The scheme, therefore, provides for 71 substations, together with 70 track-paralleling huts, seven 33 kV switching stations and three bulk supply points.

Power is obtained entirely from the British Electricity Authority. From Deptford, four 66 kV, 3-core oil-filled 0·25 sq in. cables take power to four main supply points. These cables are owned by the B.E.A. where they are outside ground owned by the Southern Region, but become railway property where they enter land owned by the railway. These feeders connect Deptford separately to 45 MVA transformers located adjacent to railway substations at Nunhead, South Bermondsey, Lewisham and Brockley. Other supply points are fed at 33 kV, also through 3-phase oil-filled 0·25 sq in. cables. The B.E.A. supply points are Northfleet (2 feeders), Wimbledon (5 feeders), Leatherhead (2 feeders) and Croydon "B" power station (2 feeders). These feeders connect up at railway substations with the 33 kV main distribution system of the Southern Region.

Cable System

The 66 kV and 33 kV feeder cables are accompanied throughout by a multicore star-quad pilot cable which carries the circuits for the Solkor feeder protection and supervisory control as well as the low oil pressure indication for the oil-filled feeder cable, telephones, electric clocks and metering. The h.v. cables are of the paper-insulated oil-filled lead-alloy-sheathed and served type with an

Our illustration above shows the cable route under construction between Cannon St. and London Bridge

On the left is a substation at Hither Green under construction showing the rectifier transformers. The substation on the right, at Nunhead, is a conversion from an old rotary convertor station. In the foreground is one of the 66/33 kV 45 MVA transformers

impervious layer in the serving, and are not armoured. The pilot cables are armoured and the number of cores in the pilot varies between 12 and 76. In general the feeder cable, with its pilot, is laid in surface reinforced concrete troughing without sand or other filling; and is covered with a reinforced concrete lid. Where there are two feeder cables, one pilot cable usually suffices, and the troughing is then divided into two compartments, the smaller one taking one feeder and the larger the other feeder and the pilot. The cables are continuously supported and where they have to be carried above ground are in asbestos cement tubes supported by steel hangers. In cases where the ground is suitable, the cables are laid direct in the soil about 1 ft 6 in. below the surface, and are protected by reinforced concrete slabs laid above each cable.

The cables are manufactured by Pirelli-General Cable Works Ltd. who have also the contract for laying. Total length of feeder cable for the entire scheme is about 300 miles, and from the beginning of the laying operation in August 1952, approximately 100 miles of cable have already been laid and jointed.

Transformers

The 66 kV supplies from Deptford are taken to 66/33 kV transformers, two of which have been supplied by the British Electric Transformer Co., Ltd., and two by the Hackbridge and Hewittic Electric Co., Ltd. All four are to the same specification and the equipment consists of a 45 MVA transformer, star connected on the 66 kV side, with on-load tap-changing equipment in eleven $1\frac{1}{2}\%$ steps to give up to $4\frac{1}{2}\%$ or down to $10\frac{1}{2}\%$ change in ratio. On the 33 kV side the transformer is delta connected, and has a separate star-connected earthing transformer, the secondary of which provides 130 kVA for oil pumps and auxiliary circuits. The neutral point of the earthing transformer is earthed through a convector type neutral-earthing resistor supplied by the British Thomson-Houston Co., Ltd. This is designed to pass 788 amps for 30 seconds.

Buchholz protection is employed both on main and on earthing transformers; and the 66 kV cables, the transformer and the 33 kV connections are protected by Solkor overall protection arranged to trip both the 66 kV oil circuit-breaker at Deptford and the 33 kV circuit-breaker in the substation.

Substation equipments are all to the same specification, and comprise one to five pumpless air-cooled mercury-arc rectifier equipments, each rated at 2,500 kW d.c. at 750 V. The rectifier transformers are all of the O.N. outdoor type and are delta connected on the 33 kV side with an externally operated tapping switch to give from $-2\frac{1}{2}\%$ to $+5\%$ voltage correction. Internal links are provided to give a rectifier output of 660 or 750 V. At 660 V the d.c. rating of the units is reduced to 2,200 kW. The transformer secondaries are arranged in twelve-phase zig-zag connections, and a tertiary winding is also provided to power cooling fans and auxiliary circuits. Full load output power of each rectifier set is 3,333 amps d.c.

High-voltage substation switchgear is of the indoor metalclad single bus-bar type with withdrawable oil circuit-breakers having a rupturing capacity of 750 MVA. The oil-filled three-core feeder cables are brought to stop-joints outside the substations, and the cables continue as 3-core screened solid type to terminal boxes on the back of the switchgear. Where 66/33 kV transformers are located, the connections between the h.v. switchgear and the transformer are also 3-core screened solid type cable.

D.C. switchgear consists of truck-mounted, high-speed circuit-breakers with a continuous rating of 3,000 amps for the feeders and of 5,000 amps for the rectifiers. The trucks for these breakers are remarkably compact, being only 2 ft wide. Feeder circuit-breakers are arranged to trip on forward current, while the rectifier circuit-breakers trip on reverse current. Protection for the rectifiers against overload is provided by inverse definite minimum time overcurrent relays, and by instantaneous overcurrent relays. Instantaneous earth leakage relays are also provided for protection of the rectifier transformers.

Section Substations

On the Western section of the system, the h.v. switchgear is of General Electric Co. manufacture, who are providing their K.S.B.7 switch units. The rectifiers and transformers are by the Hackbridge and Hewittic Electric Co., who are providing units of the glass-bulb type. A rectifier set consists of seven cubicles each containing four glass bulbs, giving 28 bulbs per set. The four bulbs in each cubicle are connected to form a 12-phase set.

D.C. switchgear for this section is manufactured by Bertram Thomas (Engineers) Ltd. The track feeder high-speed circuit-breakers are calibrated for a range of overcurrent settings from 5,000 to 10,000 amps. A relay is provided to reduce the trip value in sympathy with a drop in voltage, to the extent that if the track voltage drops to 40% of nominal value, the breaker will trip on zero current. This

feature is of importance in making the breaker more sensitive to track faults. Tripping and closing supplies are from a 50 V Chloride battery.

Contracts for the central section are largely divided between the General Electric and the British Thomson-Houston companies. Here the h.v. switchgear, rectifiers and rectifier transformers are of G.E.C. manufacture, while the d.c. circuit-breakers are by B.T.H. The rectifiers are of the 6-anode pumpless, air-cooled, steel-cylinder type, four cylinders forming a 2,500 kW set. The d.c. arrangements consist of RJR type high-speed circuit-breakers, using two in parallel to form the rectifier circuit-breakers. The track feeder breakers have hold-on coils energised from the track supply so that a falling voltage characteristic is obtained inherently at a value dependent on the overcurrent setting of the breaker. Battery equipment was again supplied by Messrs Chloride Batteries Ltd.

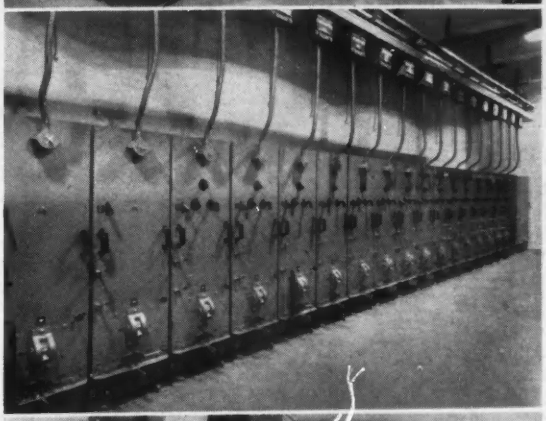
British Thomson-Houston h.v. switchgear type M.F. 36 is being used on the Eastern section, with transformer and rectifier equipments being of English Electric manufacture. Again the air-cooled, 6-anode, pumpless steel-cylinder type of rectifier has been selected. The d.c. gear is by B.T.H. and similar to that used on the central section, but the batteries are supplied by Pritchett and Gold and E.P.S. Co., Ltd.

Centralised Control

As has been mentioned, these substations are to operate unattended under remote supervisory control. Three control stations will be used, located at Raynes Park, Selhurst and Lewisham, and these stations have individual areas of control which agree closely with the railway operating areas on the Western, Central and Eastern sections within the general area of the scheme. Raynes Park will supervise 28 substations, Selhurst has 16 and Lewisham will control 26. In addition each station will have centralised operation of its essential 33 kV switching stations, supply points and track paralleling huts. Certain substations will, however, have their equipment divided between two control stations to provide alternative supervision in cases of emergency.

The G.E.C. system adopted has been devised to give rapid operation and indication, separate circuits being employed for these two functions to minimise time delay.

The complete scheme is being designed and carried out to the requirements of the Chief Officer (Electrical Engineering) of the British Transport Commission, while the installation of the cable substation and supervisory control equipment is being executed under the supervision of the Electrical Engineering (New Works and Development Section) British Transport Commission, in close consultation with the Mechanical and Electrical Engineer, Southern Region, who has also been responsible for the production of low voltage feeders and track switching equipment.



The top picture shows the 33 kV switchgear installed at the Queen's Road substation. This gear is rated at 250 MVA. Beneath it are the d.c. circuit breakers — also at Queen's Road. The downcoming plug in cables carry the operating, supervisory and indicating cables. Third is a view of 33 kV switchgear at Lewisham switching station, and finally there is a photograph of a glass bulb rectifier equipment in service at Queen's Road

notes on wiring

by Megohm

I RECENTLY met a contractor who is normally an amiable type of person. On this occasion, however, he was muttering oaths under his breath about "the people who plan installations." As I understand it, he had been called in to carry out some alterations and additions to the electrical installation in a building, where, due to staff reorganisation, partitions had been erected to give more private office space. The existing lighting points, etc., did not provide the necessary requirements and in some cases the new offices had not heating arrangements. The installation was of the screwed steel conduit type with all conduits concealed and flush type fuseboards on each floor.

The alterations to the lighting installation had proved to be quite a simple operation, the new conduits being installed on the surface of ceilings and walls from the existing ceiling points. Access to the existing wiring was obtained by fitting extension jackets to the existing ceiling outlet boxes.

Apparently it was quite a different matter when the additional 15 ampere switch-sockets were installed. Although spare ways had been left in the fuseboards, no access to the fuseboards for the new conduits was available. I can well imagine what this meant, having met such situations in past years. In my friend's case no room was available in any of the conduits for more wires to be drawn in, and I understand that eventually the wall near the fuseboard was chased and a new entry made in the fuseboard. I agree with my friend that a little forethought when planning the installation might have avoided this difficult situation. I consider that on all new installations where conduits and fuseboards are concealed some arrangement on the following lines should be made.

Where the fuseboards are sited close to roof spaces and/or ductways, two spare conduits should be run to these areas from the fuseboard. The conduits should be finished with a coupler and brass plug to ensure that the threads are protected and that no foreign matter can find its way into the conduits. I appreciate that conditions exist where neither roof space nor duct are available, so I suggest that a 4 in. × 4 in. × 2 in. adaptable box be installed above, and to the side of, the fuseboard in question. Such a box should be set flush in the wall, with two conduits installed between the fuseboard and box. By fitting an extension jacket to the box extra points can be easily added to the installation at a later date. I feel that this simple, inexpensive arrangement may well save contractors and their clients a great deal of worry.

Chases and Holes

Fresh from the encounter with my contracting friend, I crossed paths with an architect and was immediately assailed by a volley of not very complimentary remarks concerning the requirements of electrical contractors. He had just returned from a site where the building contractor was in the process of providing chases in the walls for conduit drops and the necessary holes in the floors for ceiling outlet boxes. The partition walls were of the pot-brick type. These pot-bricks have very little "body" to them and are easily fractured if roughly treated. The floors are constructed of pre-cast pre-stressed concrete slab type units, which are laid in position and require no shuttering during erection. The conduits serving the ceiling lighting points were to be run in the screeding covering the floors, with bends through the floor units to the outlet boxes under.

The pot walls had apparently been chased by means of either a power driven hammer or an ordinary hammer and chisel resulting, according to my friend, in severe disturbance to the strength of the wall. The chasing had broken away the outside wall of the brick revealing the hollow part. I have seen such damage on many sites and have heard other architects voice their concern on the matter, but I feel that the cure lies in their hands. Most reputable manufacturers now produce pot-bricks with pre-cast chases for conduits, etc., and it is up to the architect to specify these when preparing his specification. I realise that this method does not cover all the requirements for concealing conduits in walls, but feel where any other chasing is required the architect should specify that these be done by means of a power driven abrasive wheel. This method would eliminate the shock transmitted by any hammer and so lessen the danger of weakening the walls.

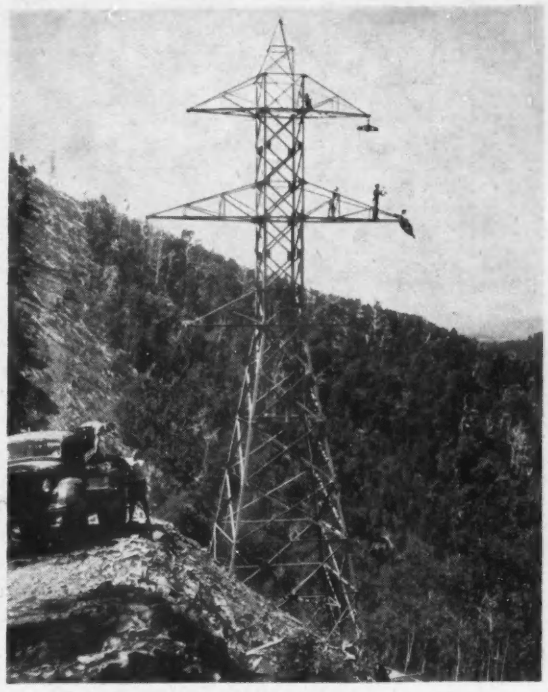
Respect for Pre-cast Units

In my view, any pre-cast pre-stressed unit, whether it be a floor unit or a beam, requires great respect when the necessity for getting a way through arises. On my friend's job there had been no such respect shown. The electrician on site had, without due reference to the building foreman, directed the workman operating the mechanical hammer to punch holes through the floors and had then proceeded to shape these holes to suit the outlet boxes and conduits serving them. Here again the full strength of the floor was reduced. The manufacturers of this type state that "holes can be arranged for electric conduits." I submit that the operative word is "arranged." I realise that in the case of points being in the centre of rooms it is rather difficult to site the units to allow for accuracy in siting the points, but feel that very careful co-operation in the planning stages could greatly assist.

Again much of the complete answer to the problem lies with the architect. His specification could cover the means of making such holes, as there are on the market to-day portable drilling machines which, with the specially tipped drills available will eliminate any damage by shock to any floors. I understand that floors formed by pot-bricks or by the filler joist methods are not so much of a worry when holes are required in them but, of course, should be treated with respect also. There is also the fact to be remembered that architects and their clients do change their minds quite a lot, and even if ceiling holes and chases are arranged at the commencement of a job there is no guarantee that the positions will be adhered to. I feel that situations such as these are where the electrical foreman can really shine.

Victoria forges ahead

Successful financial year follows lifting of restrictions



Erecting the 220 kV Kiewa-Melbourne transmission line

THE sound financial position of the State Electricity Commission of Victoria, Australia, is presented in the Thirty-fourth Annual Report. The surplus for the year ended 30th June, 1953, was £343,151 after providing full interest and depreciation, thus strengthening reserves to the extent of £514,644 and meeting £1,050,000 on account of interest and other expenditure, arising directly from the need to defer certain capital works because of insufficient loan funds.

Income from all sources totalled £20,736,565—an increase of £4,402,902 (27%). Expenditure was £3,146,094 (20%) higher. Despite the continued increase in general costs, further increases in electricity tariffs have been avoided: with the prospect of more stability in cost levels, revenue under existing tariffs is expected to meet expenditure in the coming year.

Major Works

The shortage of loan money, dealt with in the previous report, resulted during the 1953 period in several setbacks. The Morwell briquette project was entirely held up, after the foundations for the first two factories and power plant had been completed. At Kiewa, the construction of the large dams on the Bogong High Plains, on which the scheme is fundamentally based, was held in abeyance, as was also the case with No. 2 Development. Work on Nos. 1 and 4 Developments has proceeded though at a much reduced tempo, and the planned date for operation of Yallourn "D" power station has been deferred by one year.

The heavy programme of generating plant together with the limited financial resources, had repercussions on the high-voltage extensions, and as the only alternative to stopping work completely, the co-operation of prospective consumers was sought by asking them to advance, at current rates of interest, one-half of the cost involved. Over a particularly stringent period, advances were sought up to 100% to avoid the disbanding of the line gangs. This "self-help" scheme met with a greater response than was anticipated, and in consequence the rate of progress of extensions into the country was maintained.

At Yallourn, two 50 MW turbo-alternators, a 6MW back-pressure set and six 200 klb/hr boilers were ordered for the "C" station in 1947. Erection of this plant is nearing completion, and the first set is planned for the middle and the second for the end of 1954.

With minor exceptions the "D" station will be similar to "C" and orders were placed in 1950 for two 50MW sets and the associated boiler plant. Most of the excavations for the boiler and turbine house have been completed. Richmond Power Station (one 38MW set) went into full service in March, 1953.

Hydro Plant

In the hydro-field, two 60 MW sets are on order for the Eildon project, which is being carried out in co-operation with the State Rivers and Water Supply Commission. These sets are scheduled for operation in 1956. At the Kiewa project, the No. 3 Development (26 MW) which has been running since 1944, was augmented by additional water supplied from the Bogong Creek raceline. No. 4 Development is proceeding, concrete lining is being placed where required in the headrace and tailrace tunnels, and steel lining is being fitted in the pressure tunnel. Excavation for the underground power station is almost complete. Manufacture and delivery of the four 15·4 MW turbo-generators is proceeding satisfactorily, and the ultimate capacity of No. 4 Development will be 61·6 MW. Work on other parts of the project has been largely suspended.

At Newport the installation of the 30 MW turbo-alternator was completed in April, and the 30 MW frequency changer installed. This has increased the interchange capacity between the 25 and 50 c/s systems up to 54 MW.

"Packaged" plants, ordered from the U.S.A. in March and April 1951 are being erected at Geelong (30 MW), Ballarat (20 MW) and Mildura (10 MW), while the diesel plants at Shepparton (10,530 kW) and Warrnambool (4,980 kW) have been completed.

Work was begun on the new Yallourn-Melbourne 220 kV transmission line and 27% of the towers were completed. Erection of towers for the Kiewa-Melbourne 220 kV transmission line has continued and 58% of these were completed. Stringing of cables has also begun.

Production in 1953

THE SECOND PART OF A REVIEW OF OUTPUT AND ORDERS DURING THE YEAR

CONTINUING our review of the output from some of the principal manufacturers of electrical plant last year, some of the machinery produced for mining installations is of interest. The development programme of the National Coal Board has, of course, been prominent in this field: G.E.C. have received orders for two 2,100 h.p. geared a.c. winders for the new sinkings at Lea Hall Colliery in the Cannock Chase area. For Chislet Colliery, two 1,200 h.p., a.c. winders are in hand, and there is also a 1,400 geared a.c. winder for Garw Colliery. These winders are to replace existing steam driven plant. Other orders are in hand, and an unusual equipment is an 11 kV stator reverser for the 3,000 h.p. fully automatic winder at Margaret shaft, Cwm Colliery.

Metropolitan-Vickers completed thirty-one winder equipments, with a total output of 49,000 h.p. Nine of these, with an overall output of 29,000 h.p. operate on the Ward-Leonard control system, several being automatic winders fitted with bi-directional control using a biasing unit and long range cam gear. Among large home orders was one for two twin-motor 2,750 h.p. equipments for Wellesley Colliery, Scotland; with a voltage of 6·6 kV these are the largest winders scheduled for installation in Great Britain.

Overseas orders received by English Electric during the year, included mining plant for Australia, Thailand, and South America. For the former two countries, a.c. winders were in demand while for the latter the orders covered Ward-Leonard sets. The motors for the a.c. winders varied in size between 225 and 1,400 h.p., and for the other sets between 810 and 1,950 h.p. The control exciter set to be supplied on the Ward-Leonard machines is designed to give automatic speed control, regardless of the load.

Various winders of English Electric manufacture have been commissioned both at home and overseas during the year, and included in them is a twin motor-driven 3,800 h.p., 6·6 kV., 500 r.p.m. geared a.c. winder in South Africa.

B.T.H. report orders for more than twenty electric winders. In order to obtain the exact performance required for automatic winding the company advocates "closed-loop" control both for Ward-Leonard and for a.c. winders. Already Ward-Leonard equipments using this principle are nearing completion for the N.C.B. Two a.c. winders have been ordered for Polkemmet Colliery (Scotland), and one of these is to be automatic; they have contactor and resistance control gear.

The standard B.T.H. dynamic braking system uses the "volts-per-cycle" regulator, and winders equipped this way are coming into service.

Transport

The most important order received by the Marine department of B.T.H., followed the decision of Shell Tankers Ltd., to order a tanker which will be powered exclusively by gas turbines. B.T.H. will design and make detail plans of the gas turbines and the a.c. electrical

Above is shown ornamental lighting provided by Metropolitan Vickers Electrical Co. Ltd. at Messrs Ferranti's Works

equipment, while the gas turbines themselves will be constructed jointly by Messrs Cammell Laird and B.T.H. The whole of the electrical equipment will be of B.T.H. manufacture.

The machinery will comprise two gas turbo-alternators driving the single propellor shaft through two double squirrel-cage induction motors and a twin-pinion single-reduction gearbox. Astern running will be obtained by reversing contactors in the main electrical circuit. Several ships with steam turbo-electric drive have been completed or are on order.

Rail traction business during the year at B.T.H. was marked by an increased emphasis on diesel-electric locomotives and equipments have been supplied for work's shunters, main-line locomotives and railcars of six different types ranging from 155 h.p. to 1,000 h.p. The ten 1,000 h.p. locomotives for the New South Wales Government Railways were completed by the end of the year. Weighing about 80 tons each, these are of the Bo-Bo type and are for standard gauge. Good progress has been made on the contract for 104 Type P.C.M. control equipments for Toronto subway. All B.T.H. equipment was shipped to the coach builders by the end of the year, and a large number of complete coaches are actually on site. Road business has not been very active, although some new orders for trolleybus equipments have been received.

English Electric have also had several orders for diesel-electric equipment. In the electric locomotive category, however, they have delivered 2,400 h.p., 1,500 volt d.c. locomotives for the Victorian Government Railways, and further 3,600 h.p., 3,000 volt locomotives for Spanish National Railways. Three 860 h.p., 6·6 kV, 50 c/s, single-phase equipments have been installed in the motor coaches operating on the Lancaster-Morecambe-Heysham section of British Railways.

For the Manchester-Sheffield line Metropolitan-Vickers are completing seven 1,500 volt, 2,500 h.p., d.c. equipments. These will be installed in six-axle 104 ton locomotives for high-speed passenger service, and like the fifty-eight four-axle units, many of which are already in service on the Wath branch, the mechanical parts are being built by British Railways. Work is also proceeding on forty 3,780 h.p. locomotives for New South Wales. For Poland the company has had equipments in hand consisting of eight four-axle 2,200 h.p. locomotives, and a further nine 2,000 h.p. 120 ton six-axle for the Polish Coal Mines Administration are nearing completion.

The Manchester-Sheffield scheme has also occupied G.E.C. who are supplying the equipment for eight multiple train units. The company has also received a contract from British Railways covering fifteen sets of power equipment for diesel-electric shunting locomotives.

Test and Research Plant

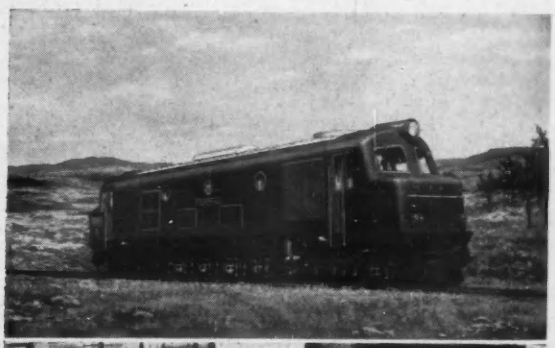
Developments in test plant are announced by Brush, where a new machine has been installed to improve the facilities for balancing and overspeeding rotors and blade systems of Ljungstrom turbo-alternator sets. G.E.C. have brought into operation at Witton Works a d.c. and a.c. short-circuit testing plant for switchgear, capable of outputs between 20,000 and 35,000 amps. For testing large alternators, there is the reactor system—mentioned in our issue of Dec 24 last year—and the first section of a new heavy current testing plant (ultimate capacity of 44,000 amps) is in process of construction.

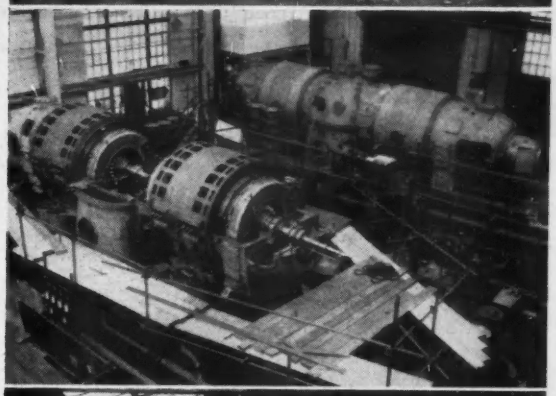
Erection and commissioning of the 400 MeV Metropolitan-Vickers, 156 in. synchrocyclotron at Liverpool University continued during the year, and the 300 MeV synchrotron at Glasgow, made by the same firm has been completed.

Below : One of 48 Metropolitan Vickers diesel-electric locos for Western Australian Govt. Rlys.

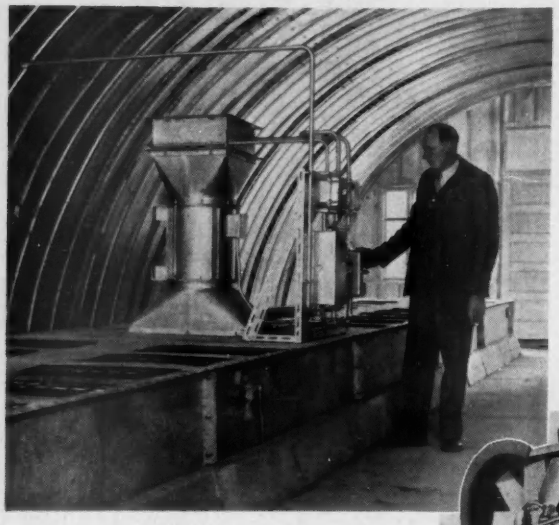
Centre : Two Brush 12,500 kW sets for Lagos, Nigeria, under construction

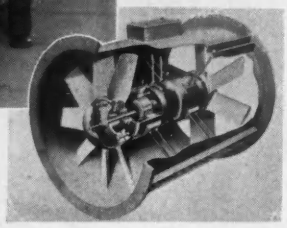
Bottom : English Electric supplied all the drives for the new blooming mill at the Consett Works





Grain Drying by Electricity





Approximate figures for costs given in lectures by G. E. C. Agricultural Dept. Engineer.

GAINS of up to £5/ton may be made on wheat stored on the farm until May or June of the following year as a result of seasonal prices announced recently. Storage during the winter months, however, is made difficult unless the moisture content is kept below certain levels—14% if stored in bulk and 14 to 16% if stored in sack. In even favourable seasons the moisture content of grain after harvesting is rarely such that these conditions are met, and farm grain drying plant thus becomes an essential part of farm equipment if the long-term storage of grain is contemplated. What this means in terms of size of plant, cost and other relevant factors for electrical grain drying systems was explored thoroughly by Mr W. Cover, A.M.I.E.E., M.I.B.A.E., of the Agricultural Dept., the General Electric Co., Ltd., in a number of public lectures in Scotland recently.

The nature and cost of the drying plant depends largely on local conditions but generally platform grain drying is more suitable for quantities up to 150 tons, whilst for 500 or 600 tons silo drying would be preferred. Plant designed for fair harvesting weather (when the moisture content is low) however, should also meet the requirements of a bad season. Capital cost similarly depends upon local conditions; any buildings or machinery already existing or the extent of mechanisation will affect the work required for the installation. Assuming a platform drier to be in operation for some 30 days with an average moisture extraction of 6% the capital cost (including an allowance for installation) may be some £2/ton of grain dried. Plant drying two tons/day might cost about £130 and four tons/day, £250. For a complete silo grain drying installation, cost may average £10 to £20/ton of storage capacity.

Electrical Equipment

When considering electrical equipment, probably one of the most popular types of fan is the dual-duty, "Aerofoil" axial flow unit, which has contra-rotating impellers driven by separate motors. This type of fan will develop nearly three times the pressure of a single stage axial flow fan. The latter unit, employed most generally for platform grain drying, may be operated against pressures of up to 2½ in. s.w.g., whilst the dual unit can work against 7 in. s.w.g. and consequently is more suitable for silo grain drying. In all cases a duct air heater is employed.

Above shows a sectional view of a dual-duty "Aerofoil" fan with a typical platform grain drying installation

As a large percentage of combine harvesters discharge the grain into sacks, considerable attention has been focussed on in-sack grain drying. Existing plants range in size from ten to 128 sack holes, air being blown into the plenum chamber below the sack platform at about 25° F. above ambient. Rate of drying depends to a large extent on the air speed through the sack. For this reason open weave sacks should be used, loosely filled to avoid air leaks round the sides. Where a low extraction rate is used, up to 0·7%/hr a propeller fan may be used, but above this value up to 1%/hr a single stage axial flow unit is required. Standard sizes of platform plant include units having an average capacity of two to four tons/day requiring a fan rating of 180 watts and a heater rating of 13 kW. For three to six tons/day, a fan rating of 0·7 b.h.p. and a 22 kW heater will be required, whilst up to 12 tons/day necessitates a 2·25 b.h.p. motor and 48 kW of heating plant.

Grain drying in silo has developed only during the last ten years, the technique relying for its success on ensuring a continuous change of the intergranular air in the silo. As the grain moisture content endeavours to assume equilibrium with the relative humidity of the air, drying takes place until balance has been obtained with the incoming air. Although the relationship between moisture content and relative humidity is still under investigation, it seems that grain with 14% moisture content is in balance with air at 60% r.h. As this moisture content is the aim for prolonged storage of grain in bulk, the necessary air conditions may be achieved by raising the air temperature a maximum of 10° F. above ambient.

The false floor of the silo should present the minimum resistance to air flow; for a new floor of correct foamed slag or "Leca" blocks the resistance is in the neighbourhood of 0·25 in. s.w.g. with an air speed of 12 to 15 ft/min. kiln bricks or wedge wire floors are preferred for greater uniformity and less liability to dust blockage. Air to each bin from the main duct should be controlled by a simple valve designed to avoid air leaks, whilst air speed in the ducting should preferably be 1,000 to 1,500 ft/min. The average approach speed of the air to the grain should be in the order of 15 ft/min.

POWER SUPPLY Statistics

JANUARY

FOR the second time within the last few months new generating plant commissioned by the B.E.A. has been conspicuous by its absence. In fact the solitary item on the January record is that of a boiler—for Huddersfield generating station, in the Yorkshire Division. This is a 180 klb/hr unit of Bennis Combustion manufacture. Following December's record of one 30 MW G.E.C. turbo-alternator and one boiler, this is the second boiler to be commissioned at Huddersfield since 1949, not for the first time, as stated in our report of the December statistics.

The January total of the installed capacity of the B.E.A. therefore remains unaltered at 18,602 MW, the total at the end of 1953. The increase over the twelve months from 31 January last year is 1,417 MW, or 8·25%. For the North of Scotland Hydro-Electric Board, the total installed capacity is now 567 MW, an increase of 7 MW, or 1·25% over the twelve months from the end of January last year. It will be remembered that these figures are the total maximum continuous rating of all generating sets in the station connected to the boiler or prime mover and to the bus-bars and which are capable of use. It includes auxiliary and standby sets but not scrap plant or other plant which has been disconnected and written off.

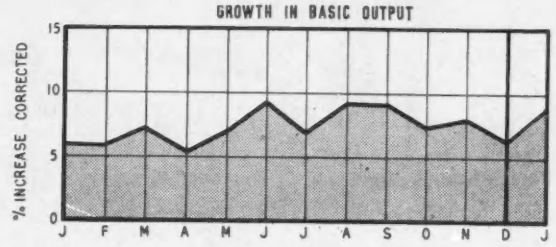
Sales of Energy

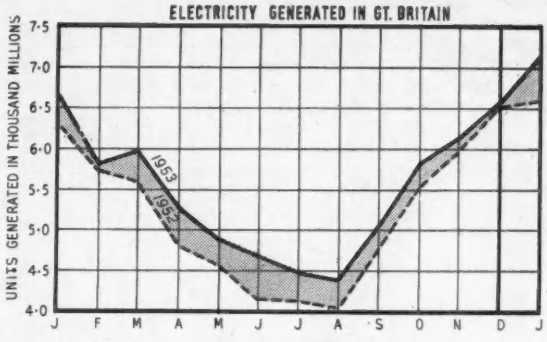
Energy sales by Area Boards during January were well up on the corresponding figure last year. Although the recent cold spell affected only the last week or so in January the generally substantial increases in sales may be accounted for almost entirely by the lower average temperature— 38°F. against 39·3°F. for January last year. That the temperature was largely responsible is borne out by the consideration that there was a small drop in the number of effective working days for the two months. Nationally the increase in sales was 7·5% (8·0% when corrected for temperature), increases by Area Boards varying between 4·1% for the London Board and 11·9% for the South Wales Board. The latter case reflects also the increase in sales due to the operation of new steel works in that area. Direct sales by the Central Authority continue to be well up. It is also seen that the North of Scotland H.-E.B. is maintaining its progress in increased sales to areas, a rise of 16% being recorded.

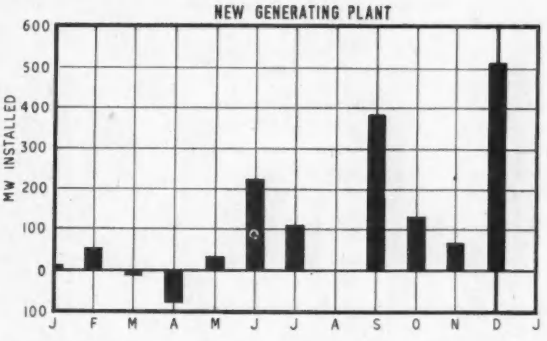
Units generated by the B.E.A. and North of Scotland Board totalled 7,122 million—an all-time record, and also exceeding the 7,000 million unit mark for the first time. Of these, 6,945 million units were generated in steam stations and 161 million units in hydro-electric stations.

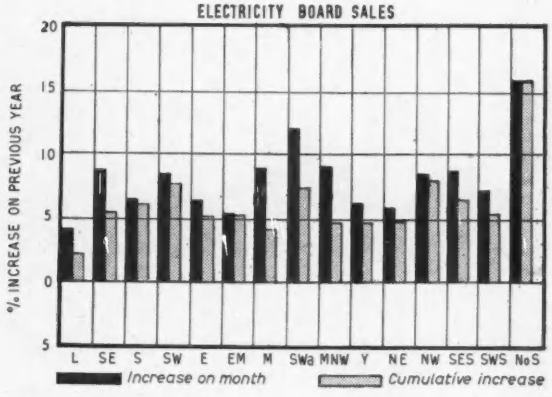
B.E.A. Sales to Area Boards in January

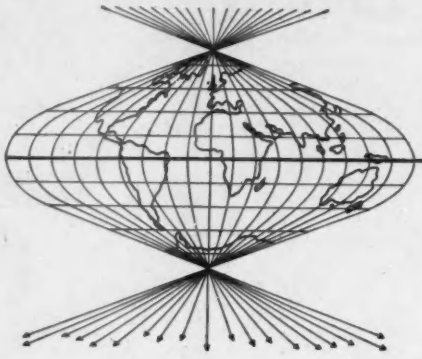
Board	Jan. Sales in million units	% inc. or dec. on Jan. 1953
London	665·2	+ 4·1
South Eastern...	389·1	+ 8·7
Southern	442·5	+ 6·5
South Western	212·3	+ 8·4
Eastern...	613·0	+ 6·6
East Midlands	500·6	+ 5·4
Midlands	685·8	+ 8·9
South Wales	350·0	+11·9
Merseyside and N.W. ...	367·3	+ 9·1
Yorkshire	631·7	+ 6·3
North Eastern	361·0	+ 6·0
North Western	713·4	+ 8·6
South-East Scotland	138·7	+ 8·7
South-West Scotland... ...	328·8	+ 7·3
Direct Sales by B.E.A. ...	93·9	+25·0
Grand Total	6,493·3	+ 7·5











OVERSEAS NEWS

A SUMMARY OF IMPORTANT EVENTS

CANADA

Discussions at Winnipeg

A delegation from Winnipeg City Council met Mr D. L. Campbell, Premier of Manitoba, earlier this month, for general discussions on the provincial government's latest power proposal, to which we referred on 11 Feb. It was agreed to set up a joint city-provincial committee of technical experts to examine all phases of the proposal. At the meeting the city delegation asked whether the government had considered passing over the whole metropolitan distribution system of the Winnipeg Electric Co. to the city, but were told that the government had discarded that idea.

Canada's Imports

Imports into Canada of heavy electrical apparatus from Europe in the first nine months of 1953 were over $69m, more than 800% higher than over the same period of 1952, according to figures prepared by the Bureau of Statistics. That figure compares with a rise in all imports from all countries of about 11% in the same period. The list shows that such goods imported from the United Kingdom totalled $14·5m, compared with only $1,445,500 in the previous year.

Action Against Firms?

The Canadian Government is planning to take some of Canada's largest electric wire and cable makers to court on price-fixing charges, it is stated. We reported on 3 Dec. last that ten Canadian cable companies had been named as participating in an illegal price-fixing ring. Which of the companies named in that report are to be prosecuted it is not yet revealed.

U.S.A.

Another Survey

The U.S. Senate Foreign Relations Committee has unanimously approved a Bill providing for a $3 million survey to determine the cost and economic feasibility of the Passamaquoddy tidal power project. It is suggested that the survey should be under the direction of the International Joint Committee on boundary waters, to determine whether power could be produced by harnessing tides in the Passamaquoddy Bay area between Maine (U.S.A.) and New Brunswick (Canada). The suggestion thus to use these tidal waters was first put forward in 1919.

BRAZIL

An Explanation

Foreign owned electricity supply companies operating in Brazil are not in jeopardy after all, it seems. President Vargas recently, in a radio speech, referred to the plan to create a nationalised Brazilian power corporation with the title of Electrobas (as we have already recorded) "to provide increased power installations in Brazil." He emphasised that his plan did not contemplate the nationalisation of companies owned by foreign capital or the appropriation of present enterprises.

EUROPE

Loans for French Concerns

A number of French manufacturers of electrical equipment contemplate floating a big loan to finance their modernisation drive, it has been stated by the Industrial Association. Following the example of French steel producers who succeeded in raising 8,000 million francs in Dec., the large electrical equipment firms, including Alsthom, Compagnie Generale d'Electricite, Thomson-Houston, and Alsaciene de Constructions Mecaniques have set up a financial group to handle loan operations. Initial capital of the group will amount to 125 million francs, it is stated. The organisation is known as "Groupement des Industries Electriques, Electromecaniques et Electroniques."

Portugal's Refrigerator Market

Reasonably good prospects for the sale of domestic refrigerators in Portugal are envisaged in a survey recently completed. This shows that out of a total of 3,025 units imported into Portugal during 1952, U.S.A. firms supplied 1,361 and British concerns 786. In the previous year, American firms provided 1,813 and British companies 1,969 units out of a total of 5,007 imported. It seems that importers from the United States are slightly handicapped by a shortage of dollars, while local dealers report a demand for refrigerators of from 3 to 5 cu ft capacity in which the U.K. specialise. One point is emphasised—the popularity of American models in the market is largely due to the greater attention given by U.S. manufacturers to the interior fittings and decorative finish of their products. In other respects, British machines are as good as other makes. A warning is also given of the likelihood of increased competition from German and other Continental manufacturers, who, so far, have taken only a small share of the market.

Electrification in Austria

We have news from Austria that it is planned to commence work this year on the electrification of the railway lines Bregenz to Lindau, on Lake Constance; Villach to Rosenbach on the line to Yugoslavia; and Villach to St. Veit a.d. Glan via Klagenfurt. As soon as electrification of the line from Villach to Rosenbach is completed, work will begin on the remaining stretch through the Karawanken tunnel to the Austro-Yugoslav frontier station of Jesenice. This line is a trunk line from Germany to the Balkans, and on its completion it will be possible to operate electrically the entire line from Germany to Yugoslavia via Salzburg. Construction work on this project is likely to continue until 1956. The Austrian Federal Railways have laid down a new 7-year electrification programme, after the completion of which more than 40% of Austria's entire railway system will be electrified.

MIDDLE EAST

Power for Iraq

The Iraqi Government plans to provide an electricity supply in every town and village in the country. According to the Director General of Municipalities, Sayid Abdul Razak Shekarah, now that the government has sufficient funds, it has been decided to meet fully the requirements of the population as soon as possible. (Some details of these steps were given in our 28 Jan. issue.) He said that several of the existing d.c. systems in the larger towns, such as Amarah and Nassidiyah, were being changed over to d.c. Arrangements were also in

hand to change over from d.c. to a.c. to supply system in the towns of Diwaniyah, Kuk, Ramadi, Felujah, Baqubah, Khanaquin, Arbil and Sulaimaniyah, he added. In regard to towns without a supply, arrangements were in hand to provide suitable a.c. plant. Such work was in operation for fifteen towns, the completion of which was expected this year, while estimates were being prepared for similar schemes for another 43 towns and villages.

S.W. ASIA

Power for Pakistan?

According to reports, discussions are taking place for an agreement providing for a supply of electricity to be given to West Pakistan from India's Bhakra-Nangal hydro-electric project. The Ganguwal powerhouse in that project is expected to start generating 24,000 kW by Oct. next, but on completion of the Bhakra dam itself, and other powerhouses, the project will be producing 400 MW. Considerable progress has already been made on construction of the associated 200-mile-long Rupar-Ambala-Delhi 220 kV transmission line. It seems, however, that there are doubts whether the demand in India itself will quickly absorb the output of the project.

Lamp Inquiry

At the recent inquiry into the claims of Pakistan's electric lamp industry for a continuation of import duty, representatives of the Rainbow United Syndicate estimated the local demand at 1½ million annually, while the Department of Supply and Development gave an estimate of about 3 million. It was observed that almost all the raw materials required for the manufacture of electric lamps were being imported. The manufacturers were not required to pay any customs duty on certain of these materials, e.g. glass tubes, brass caps, filament and leading-in-wires and inert gasses. On glass shells they had to pay a duty of 35% *ad-valorem*. On the other hand, the customs duty on the finished electric lamps (excluding bulbs for torches and automobiles) was 60% *ad-valorem*. For bulbs for torches and automobiles the duty is 50% *ad-valorem*.

The manufacturers demanded that since they were equipped to produce more than the estimated demand of the country, the existing ban on the imports of general purpose lamps should continue. They also asked for the imposition of 100% duty on all lamps imported into the country and a rebate of customs duty and sales tax on all raw materials. The importers present objected to the imposition of higher duties on special type lamps.

FAR EAST

Philippines Programme

The Philippine National Power Corporation has announced a two-year, 123 million pesos, national hydro-electric power development programme. A sum of 65 million pesos has been made available this year to finance the simultaneous construction of priority power projects—seven small plants and two major ones—at various sites throughout the country. Another 58 million pesos to finance eight new power installations and assure continuance of previous constructions has been allocated for next year.

AUSTRALIA

Tully Falls Progress

The first power from the Tully Falls 94 MW hydro-electric project, Queensland, should be available before the end of this year, it has been announced. Power from the scheme will be taken into the Cairns network. The Tully Falls scheme is planned to link with the proposed Burdekin Falls hydro-electric project. Along with the Barron Falls plant it is one of the first moves to exploit North Queensland's hydro-electric potential—estimated conservatively at more than 316,000 kW.

Power for Aluminium

Another step in the provision of power for the Bell Bay aluminium project is the placing of a contract for the erection of transmission lines, just announced. A Sydney, N.S.W., firm, Electric Power Transmission Ltd., is to erect the towers and the line from Trevallyn power project of the Hydro-Electric Commission of Tasmania, to link the Australian Aluminium Commission's Bell Bay scheme, a distance of 28½ miles.

NEW ZEALAND

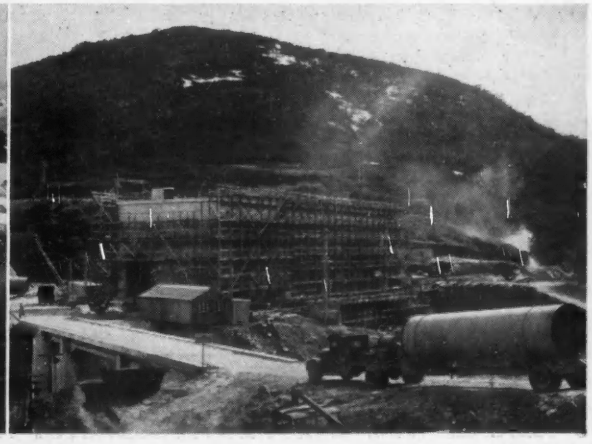
Plans for Renewal

The Thames Valley Electric-Power Board, New Zealand, is faced with renewals and maintenance to its installations over the next ten years to the extent of £700,000, according to the report of the secretary-treasurer, Mr A. E. Ross, presented to the board earlier this month. The work had accumulated through a variety of circumstances mainly due to 6 years of war and 3 years of post-war shortages. The estimate of £700,000 includes 15,000 new poles, the substitution of small conductors for heavier lines, 8,500 service lines, and sub-mains costing about £102,000. Mr Ross also reported that during the nine months ended 31 Dec. last, the Board sold 80·8m. units, an increase of 26·6% over the corresponding period of the previous year. Operations for the nine months had resulted in a surplus of nearly £53,000.

Maraetai's Fourth

The fourth 36,000 kW generator at Maraetai power station, New Zealand, was put into operation recently, bringing the station's output up to about 144 MW. The fifth and last set should be running about Easter. For the next few months Maraetai is unlikely to run at peak load, but when winter comes all the station's output will be needed to meet the annually-growing demand for power.

Good progress is being made in construction of the first project in the Snowy Mountains hydro-electric scheme, Australia, as these latest photographs show. At the Guthega power station, on the right, the first 30 MW English Electric Co. machine should be operating by the end of the year. One of the penstock sections is seen arriving by road. On the left is the dam under construction at Munyang, which is linked by 3¼ miles of under-mountain tunnel with the station



Personalities IN THE INDUSTRY

Manchester branch manager for British Insulated Callender's Cables Ltd., since 1953, **Mr A. Trickett** has been appointed assistant sales manager to W. T. Glover and Co., Ltd. He received his initial training with the Callender's Cable Co., at their Anchor Works, having joined that concern in 1915. He transferred to the sales organisation in 1922, was appointed outside sales representative in 1925, and subsequently established their Preston branch in 1943. Following the amalgamation of the Callender and B.I. interests he took charge of their Blackburn and Preston branch.

The Council of The Institution of Civil Engineers announce that they have appointed **Mr Alexander McDonald,** B.SC., M.I.C.E., to the position of secretary of the Institution, to succeed **Mr E. Graham Clark,** C.B.E., M.C., M.SC., M.I.C.E., who will be retiring this year.

Mr Rowland Alger, managing director of Alger Wholesale Supplies Ltd., has been nominated president-elect of the Newport and Monmouthshire Chamber of Commerce.

Mr R. H. Hemmings, director of York Shipley Ltd., has been unanimously reappointed chairman of the council of the British Refrigeration Association for the year 1954.

At present turbine room superintendent at Kearsley power station, North Western Division, B.E.A., **Mr J. C. G. Jones** has been promoted to deputy station superintendent there, with effect from 1 Mar. Mr Jones has been turbine room superintendent since Nov, 1948, and was previously charge engineer at Kearsley and Radcliffe power stations. He began his career in the Electricity Supply Industry in 1931 as an apprentice engineer at Padiham power station.

Major, Robinson and Co., Ltd., announce the appointment to their Board, as sales director, of **Mr F. J. Robins,** who has been associated with the firm for some considerable time on the sales side. Born in 1912, an Oxford Graduate in Economics, he served throughout the war as a captain in the Royal Artillery, seeing service in the Middle East and South European campaigns. Mr Robins is resident in London, and is in charge of the company's London office at Evelyn House, 62 Oxford St, W.1 (Telephone: MUSeum 5229) from where he deals with matters relating to the South Eastern area of the country.

Mr W. T. Litchfield, who was with the English Electric Co., Ltd., for 17 years, has joined the Publicity Department of Thorn Electrical Industries Ltd.

Recently retired from the Hydro Electric Power Commission of Ontario, Canada, **Mr H. E. Davidson,** B.A.SC., C.E., M.AMER.I.E.E., M.AMER.MET.SOC., is presently going abroad, we hear. He will attend the C.I.G.R.E. meeting in Paris in May, and then go to Australia and New Zealand. It will be recalled that he reported considerable experience with and study of the major transmission hazard of glaze and sleet, æolian vibration and "galloping conductors" amongst other problems. He was project engineer for one of the larger power developments at Niagara Falls and worked on another from anchorages to bed rock to the completion of the roof. His address while abroad will be Hatuma, Hawke's Bay, New Zealand, and home address is 11 Highview Cres, Toronto 10, Canada.

Mr C. A. Cameron Brown, agricultural electrification adviser to the B.E.A., has not yet left this country for his visit to Turkey, to which we referred last week. It seems unlikely that he will leave before 23 Mar., we now understand.

Deputy chief engineer (transmission) to the British Electricity Authority, at headquarters since November, 1948, **Mr D. P. Sayers,** B.SC., M.I.MECH.E., M.I.E.E., has been appointed deputy chairman of the Midland Electricity Board, in succession to **Mr D. H. Kendon.,** B.SC.(ENG)., M.I.E.E., M.I.MECH.E., who is now chairman of the Merseyside and North Wales Electricity Board. Mr Sayers thus returns to territory with which he is already familiar, for apart from being chief engineer to the Midlands Electricity Board from 1948 to 1949, he was deputy chief engineer and manager of the Birmingham Corporation undertaking from 1936. Earlier he was with the Sheffield undertaking for seven years, ultimately as chief assistant engineer. Born at Staines, he graduated with honours at Birmingham University, and gained early experience with British Insulated Cables Ltd., Blackburn Corporation and G. V. Twiss and Partners. From 1930 to 1936 he was with Kennedy and Donkin, during which he was engaged on work for the C.E.B. and for the Northern Ireland electrification scheme. Mr Sayers' new appointment is with effect from 1 Mar.

District engineer at Huddersfield to the Yorkshire Electricity Board, **Mr R. Bryant,** A.M.I.E.E., A.M.I.MECH.E. M.INST.F., has been appointed senior assistant engineer (construction) with the Board's No. 2 (Huddersfield) sub-area. Prior to vesting day, Mr Bryant had been power station superintendent at the Halifax generating station since 1941. He gained earlier experience with the Rotherham corporation undertaking.

Sir Rex Hodges, whose retirement from the position of general manager and secretary of the Mersey Docks and Harbour Board has been announced to take place in March, is joining the board of British Insulated Callender's Cables Ltd. as from 31 Mar. next.

Mr D. P. Sayers

Mr A. Trickett

Mr F. J. Robins

Sir Rex Hodges

Mr E. G. Batt

The Metropolitan-Vickers Electrical Co., Ltd., announces that following the transfer of **Mr W. L. Beeby** to the Edison Swan Electric Co., Ltd., **Mr C. H. Smith,** A.M.I.MECH.E., was appointed works engineer, and **Mr J. H. Phillips** has been appointed assistant works engineer. Educated at Bromsgrove County Grammar School and Birmingham Technical College, Mr Smith served an apprenticeship with the Austin Motor Co., Ltd., and after experience in the Works Engineers' Department, was appointed assistant works engineer. He joined Metropolitan-Vickers as assistant works engineer in 1946. Mr Phillips, following technical education and an engineering apprenticeship, obtained early experience in a steelworks in South Wales. He joined Metropolitan-Vickers in 1927, as a maintenance draughtsman in the Works Engineer's Department, and became maintenance engineer of the Mosley Road Works in 1946.

Mr Leslie M. Reay, M.B.E., has been appointed London sales manager of the Electric Motor Division of Newman Industries Ltd. He has been with the company for five years as a sales engineer in the London area. During the war he served with the Royal Engineers and is now on the Regular Army Reserve of Officers with the rank of Lt. Col. Before the war he was with Frigidaire Ltd., and the Dominion Rubber Co.

Managing director of Beard Electrical Ltd., of Tipton, **Councillor J. D. Beard,** M.B.E., has been nominated mayor-elect for Oldbury.

We are now able to reveal that **Mr E. G. Batt** is to retire from his position as director and secretary of the British Refrigeration Association at the end of March. He has held that position for the past seven years, prior to which he was independent chairman of the Association. Mr Batt is well known for his infectious enthusiasm for the Refrigeration Industry, and is a popular figure at various Conventions. The Association has placed on record its abounding appreciation of his very valuable and efficient services rendered not only to the Association but to the Refrigeration Industry in general. Mr Batt's services will in the future be available to the Association in a consultative capacity.

Mr C. H. Smith

Mr L. M. Reay

Mr A. E. Iliffe

Mr G. E. Taylor, Mr W. J. Millar and **Mr A. C. Geddes** have resigned from the board of The Electric Furnace Co.

To mark his retirement from the Chair of Physics and Electrical Engineering at University College, Dublin, a group of his past students recently presented **Prof F. E. W. Hackett** with a portrait executed by Sean Keating. Prof J. J. Morrissey, Professor of Electrical Engineering, University College, Dublin, presided at the meeting, Mr D. McAteer, A.R.C.SC.I., and Prof T. S. Wheeler, Prof of Chemistry, University College, Dublin, making the presentation. Among those present were Messrs B. O. Mongain, engineer-in-chief, Department of Posts and Telegraphs, P. J. Dowling, past chairman of the Irish Branch of the I.E.E., G. Ring, R. L. S. McDowell, P. Harkin, A. S. Litton, R. A. H. Jackson, P. G. Boyd, J. O'Dea. Professor Hackett, recently elected President of the Royal Dublin Society, received his B.A. degree in the Royal University in 1902, his B.Sc. in 1903 and his M.A. in 1904. In 1905 he received a Fellowship award. After working for two years in collaboration with Prof McClelland in Dublin on research in the field of radio-activity he went to the Johns Hopkins University in the United States where he carried out research on spectra under Prof Wood, and obtained a Ph.D. degree. Returning to Ireland in 1908 he accepted a Lectureship in Physics in the College of Science which he held until 1922 when, on the retirement of Prof Brown, he was appointed to the Chair of Physics and also in the same year was appointed Dean of the College. In 1924 the merger of the College of Science with University College, Dublin, was effected and Dr. Hackett became Professor of Physics and Electrical Engineering in U.C.D. In 1932 he was elected to the Senate of the National University of Ireland and up to his retirement last year was at all times an active participant in the affairs of College and University, and in other educational matters.

Prof. Hackett beside the portrait, with Mrs. Hackett and Mr. D. McAteer

Director and general sales manager of Benjamin Electric Ltd., **Mr A. E. Iliffe,** left yesterday, 24 Feb., on an overseas business tour, with the object of making direct contact with the main distributors. He is visiting India, New Zealand and Australia, with a few days at Singapore en route, and expects to be back in London in June.

Mr J. N. Dean, deputy chairman of the Telegraph Construction and Maintenance Co., Ltd., left London on Monday last by air for Johannesburg to visit the firm's subsidiary in South Africa, Telcon Cables (S.A.) (Pty.) Ltd., to discuss future operations. He is expected back next week.

Mr D. C. Espley, O.B.E., D.ENG., M.I.E.E., chief engineer (telecommunications) to the Research Laboratories of the General Electric Co., Ltd., has recently been elected a Fellow of the Institution of Radio Engineers with the citation "For his creative contributions to microwave and television techniques in England."

In the "experimental" amalgamation by the B.E.A. of the North Western and the Merseyside and North Wales Generating Divisions (to which we refer on page 292), **Mr A. R. Cooper,** A.M.I.E.E., M.INST.F., controller of the North Western Division, and **Mr P. Briggs,** M.INST.F., controller of the Merseyside and North Wales Division, have respectively been nominated Divisional Controller and Deputy Controller of the amalgamated Division.

OBITUARY

Mr John Rogers, who has been associated with the English Electric Co., Ltd., for many years, died on 15 Feb, aged 61. From 1938 until last year, when he was granted indefinite leave, because of poor health, he had been general manager of works for the company and a director of the English Electric Export and Trading Co.

Mr F. G. Clark, M.B.E. A.M.I.E.E., formerly of Harland and Wolff Ltd., Glasgow, died on 14 Feb.

Mr W. L. Webb, a former manager of Derby Corporation Electricity Department showrooms, died recently, aged 70.

Mr R. Litt, formerly chief statistical officer to Central London Electricity Ltd., died on 21 Feb., aged 69.

PROBLEMS AND PRACTICE

In Engineering

Assisting Production

FROM time to time, motors and starters are changed about, due to maintenance, etc., and the terminal markings become indistinct. To reservice the above apparatus it is necessary to trace the circuits in a starter and to ascertain the correct connections before making connection to the corresponding terminals of the 3-phase motor stator windings. To facilitate connecting the starter to its motor correctly and within a short time, I have found the following method satisfactory.

Initially, connect all six cables to the starter terminals irrespective of markings and leave the free ends of the cables unconnected. Secondly, place the starter handle in the "start" position and then apply a "Megger" test to the cable ends to be connected to the motor terminals. Three of the ends should be open-circuited and the remaining three ends should be short-circuited. Connect the short-circuited ends to three terminals on the motor, either the three ends or three starts as shown in Fig. 1 (a).

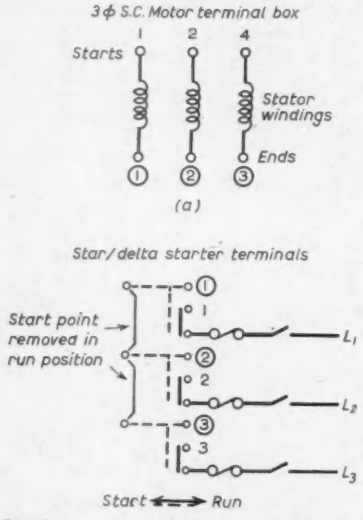


Fig. 1. Connections for starter terminals for correct wiring of starter to motor and supply

Thirdly, place the starter handle in the "run" position and re-test the six ends from the starter. Incidentally, test for continuity from the motor terminals not connected, thereby including stator windings in each test.

Three pairs of cables should be indicated and should the three ends, as in the first test, have been connected as shown in Fig. 1 (a), namely (1), (2) and (3), then their respective ends of 1, 2 and 3 should be connected to the motor terminals as shown in all cases. Any incorrect circuits and open circuits in the starter and motor will be detected during these tests and may be put right prior to the running up of the motor.—*E. N. Alderton.*

Every engineer has a story to tell; why not tell yours on this page? We welcome contributions to this feature, and those published will be paid for at our standard rates. Problems which are encountered and overcome in day-to-day maintenance or installation of electrical plant; useful methods and techniques developed for specific jobs, or current practices, all make instructive reading for others. We will also consider for publication problems requiring an answer. Sketches are often helpful and need only be rough, as they will be redrawn before use.

Bell Transformer Rating

A NEIGHBOUR of the writer purchased a set of British made electric chimes and stated that the shopkeeper could not tell him how they should be connected. The chimes were attractively made and were fitted with four terminals, two of which connected directly to a mercury make and break switch and an adjustable resistance and had a low voltage supply been connected to these terminals, the resistance would probably have been burnt out. Here, a diagram of connections, preferably pasted to the chimes, was certainly desirable.

When the chimes replaced the original bell, the voltage of the bell transformer dropped from 8 V to 3 V and the transformer was obviously too small. A much larger looking transformer was purchased, largely on the strength of the following data embossed on the cover:

Made in England, Volts 200-250, 40-100 c/s, 1 amp, 0·5 Watts, 3+5=8 V output.

On this data something like 8 VA was expected. When connected to the chimes the output voltage dropped from eight to five and the chimes were mute. The 0·5 watt is a figure of mystery unless it relates to the primary no-load input, this figure being of small interest to the purchaser, but possibly a source of benevolent pride to the Electricity Supply Authorities!

It was proved that the 1 amp did not mean much either. With an auto-transformer, the supply was increased to 250 V in case the transformer was designed for that voltage, but nothing like 1 amp could be obtained. The 8 V output dropped to 5 V with a load of 0·75 amp, the voltage rapidly collapsing with further loading. A calculation from the cross-section of the coil gave an output of about 3 VA.

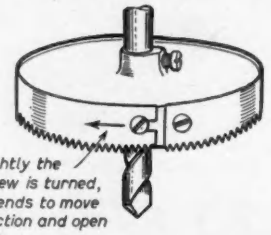
This all seems to add up to the following conclusions:

1. The output of bell transformers should be rated correctly or not at all.
2. Primary coil tappings would prove advantageous particularly if transformers are likely to be exported.
3. Output voltages could with advantage be increased to (say) 5+7=12 and still be well within the I.E.E. regulation limit of 15 V. Whilst small bells will work satisfactorily on 3 V batteries. 3 V a.c. is practically useless particularly if circuits have the added impedance of pendulum disc indicator coils.
4. Transformers of at least 5 VA are indicated for many modern low voltage requirements, particularly for chimes which are considerably increasing in popularity.—*K. Coombs, Capetown.*

Hole Saw-cutter Improvement

THE hole or ring saw is one of the spark's best friends. The saws and holders for the various conduit sizes take up little room in the tool-kit; the holder constructed of aluminium alloy is light in weight and all sizes can be taken by a ¼ in. Morse drill, which with a square shank fits in a carpenter's brace.

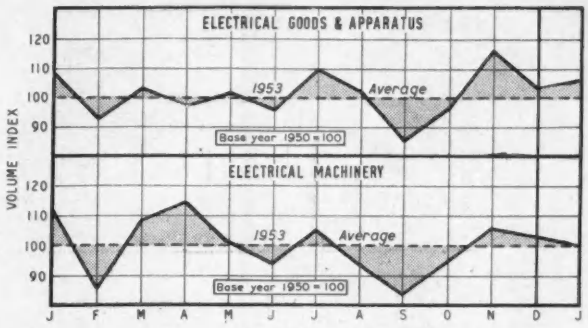
There is, however, one snag when using this tool, i.e. when one puts the inevitable pressure on drilling, the teeth-end part of the hole saw blade tends to spread and the hole is not cut cleanly but becomes widened; as a result the sharpest part of the teeth is not used. When this happens more pressure is usually applied only to accentuate this weakness. The result is costly in effort and blades and in addition the poor fit for bushes and conduit makes metal bonding as part of the earth circuit difficult.



Drawback in the use of hole saw-cutters of this type is overcome by binding the blade with wire

On examination of the blade and holder the cause is not far to seek; the screw fixing being insufficient to hold the blade when under load, as shown in the accompanying sketch. My solution is a simple one but effective. I bind with one strand of 7/·029 gauge earth wire some eight turns tightly round the blade and twist the ends together. In this way there is a much firmer feeling when drilling, the blades last longer and the holes are cut more nearly true.—*M. N.*

EXPORTS and IMPORTS



Statistics for January

RESULTING from the complete re-classification of items in the Trade and Navigation Accounts issued by the Board of Trade, the immediate assessment of the volume of electrical exports in Jan. is made somewhat more difficult. It seems clear, however, that the volume of exports in the now superseded category of electrical goods and apparatus was a little higher than in Dec. of last year, the volume index standing at 106 as against 99·5. Compared with the corresponding month last year, exports have fallen somewhat, the Jan. 1953 index being 108. In the other class — electrical machinery — exports have fallen a little from the Dec. volume, the index being 100 as against 103. For Jan. 1953 the volume index was 112, all index figures being based on 1950 as 100.

It should be borne in mind, however, that the above indices, particularly that for the first category, are only approximate, being taken from figures extracted from a list of all electrical exports. Whereas previous accounts gave the two categories separately, both are now included in a general group covering all the electrical items exported from this country and including articles not previously listed in the two categories. For this reason, extracting figures strictly comparable with those given in the old classification was not possible. Moreover, non-availability of index figures for the new group prevented any assessment of the export volume index under the new classification. It is hoped, however, to be able to give next month a single volume index of exports of electrical equipment which will supersede the two now given.

The revision of the Board of Trades' statistics has been undertaken in order to change the commodity classification to a system based on the Standard International Trade Classification of the United Nations.

Description	Exports Value (£)			Imports Value (£)	
	Monthly Average 1952	January 1953	January 1954	January 1953	January 1954
Generating Sets:					
Diesel up to 200 kW	408,225	335,365	286,929		
„ over 200 kW	214,949	91,475	341,702		
i.c. driven	31,920	28,163	15,662		
Steam turbine driven	143,882	104,168	6,811	50,406	19,862
with other prime movers	31,520	37,707	97,669		
Generators	210,823	525,345	200,567		
„ parts	369,110	659,555	605,586		
Motors	892,465	901,007	915,375	63,518	28,354
Motor starters and controllers	234,035	288,268	218,509		
Convertors and rectifiers	103,602	66,249	106,001	41,049	70,881
Transformers	873,260	993,741	1,082,952		
Switchgear and Switchboards	1,291,656	1,287,925	1,249,119		
Batteries, primary	212,536	190,224	317,924		
Fluorescent and Discharge lamps	53,194	44,953	60,891		
Other lamps	123,932	105,127	203,122		
Radio and Electronic gear	1,916,241	1,803,740	1,971,712	302,534	582,831
Telephone and Telegraph Plant	1,372,016	1,804,835	1,445,495		
Cooking Appliances and parts	114,943	116,835	104,910		
Space heaters	26,489	18,605	17,089		
Water heaters	32,963	33,827	32,738		
Other heaters and parts	128,498	119,802	133,026		
Welding machinery	86,132	110,055	80,439	6,116	10,202
Signalling and Bell equipment	53,722	81,559	59,021		
Commercial Instruments	135,473	128,592	167,336	34,578	53,910
House Service Meters	147,816	103,064	119,768		
Electro-medical and X-ray apparatus	118,910	170,607	120,412	24,761	38,468
Fans	110,447	176,267	135,155		
Vacuum Cleaners	159,303	95,274	189,958		
Other Appliances and parts	232,481	199,980	224,675		
Portable power tools	112,423	164,429	125,557		
Washing Machines up to 150 lb	443,379*	162,194	298,005		
Telephone and Telegraph Cables	746,946	656,770	587,552		
Paper-insulated Cables	883,068	1,329,920	791,697		
Rubber-insulated Cables	622,124	538,176	366,642	4,920	8,787
Winding and similar wires	151,677	211,619	107,492		
Other Cables and Wires	276,939	399,886	228,438		
Accumulators and parts	452,491	318,298	341,667		
Insulating Materials	165,900	97,675	122,189		
Electrical Ware	103,886	88,809	102,042		
All other articles	1,595,762	1,377,623	1,673,826	188,664	267,903
Total	15,485,075	15,968,711	15,255,850	704,649	1,138,495

*Including models of up to 250 lb in weight.

Equipment for Industry

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Hand Filing Machine

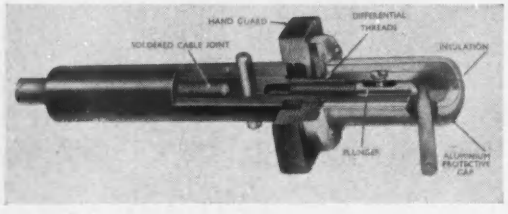
FINISHING stages in the production of punches, dies, moulds and similar precision units usually require hand working to ensure high accuracy. To eliminate the fatigue of such operations without detracting from the precision required, BROOKS AND WALKER LTD., 47 Great Eastern St, E.C.2, produce a hand machine which provides the necessary reciprocating action associated with filing. Known as the "Diprofil," their hand filing machine weighs less than 1 lb and is driven through flexible shafting from an electric motor. Normally suitable for filing, honing, lapping, scraping and polishing, the unit can be used with rotary hand pieces for milling, grinding and engraving.

Driven by a universal a.c./d.c. motor available for 110/120, 200/220, and 230/250 volt supplies, the unit has a six speed foot control which gives a maximum speed between 8,000 and 10,000 r.p.m. Its reciprocating speed may be varied from zero to 100 strokes/min whilst the stroke length can be adjusted from zero to 6 mm (0·236 in.). Automatic compensation for balance at the different strokes and speeds is provided. An extension arm is available combined with a diamond-impregnated disc for finishing and polishing certain surfaces.

Welding Electrode Holder

ALTHOUGH accidents to welding operators are fortunately of rare occurrence, a recent fatal electrical shock to a welder in a South Wales steel factory emphasises the need to ensure that welding accessories are of suitable design. Of interest in this sphere of equipment is a "Mascol" electrode holder, manufactured by the QUASI-ARC CO., LTD., Bilston, Staffs, a sectional view of this accessory being shown in the accompanying illustration. Having an insulated nose protected by an aluminium cap, fear of accidental short circuits when using the unit in confined spaces is minimised. Its hexagonal body is of copper alloy of high conductivity, whilst the electrode is gripped by a plunger whose movement is controlled by both left and right hand turning mechanisms, designed to ensure its being locked in position.

This sectional illustration of Quasi-Arc's electrode holder shows its construction well



Dual Current Rectifier

DESIGNED to ensure a smooth current supply for welding light alloys, non-ferrous metals and light gauge sheet, a current rectifier recently developed by PHILIPS ELECTRICAL LTD., Century House, Shaftesbury Ave., W.C.2, is arranged to give an output of 40 to 240 amp a.c. or 10 to 80 amp d.c. Designated the type 1308/1, this dual current rectifier may also be used as a supply for carbon-arc welding whilst the comparatively high a.c. output enables its use for general welding construction and fabrication, repair and maintenance welding. In both a.c. and d.c. ranges, the current output may be varied infinitely between the limits stated, a calibrated scale indicating welding current on either range.

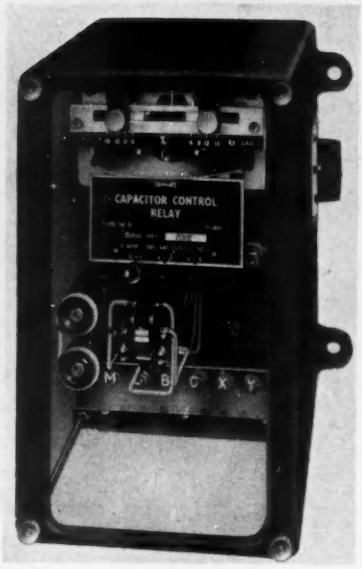
When supplying direct current, the transformer output is fed to two rectifier valves, protected against premature loading by a time delay unit and against excessive current input by a micro-switch arrangement operated directly from the shunt mechanism. Direct current obtained from valve rectification is claimed to be free from "flickering" whilst rapid response and arc recovery time are further advantages. Oscillograms, it is stated, show that barely 0·002 seconds are required for recovery.

The unit is designed for a 380/440 volt 50 c/s, three-phase supply but may also be supplied for two-phase systems of 200/220 volts. Having valves fully spring mounted for arduous service, the rectifier is contained in a drip proof case of approximately overall dimensions of 22½ in. by 24 in. high.

Capacitor Control

DESIGNED specially for the automatic switching of power factor correction capacitors, the relay introduced recently by FERRANTI LTD., Hollinwood, Lancs, is now in full production, whilst many installations, it is stated, have proved successful. The unit provides single stage control such that the connection of each capacitor is determined by conditions of the load associated with the particular capacitor.

Comprising an induction disc type, wattmetric relay, the main element has its current and voltage windings arranged to ensure the element's response to the reactive component of the load volt amps. At unity power factor, the spring controlled copper disc is stationary. On the load p.f. becoming less than unity and lagging the disc moves to the right, and to the left for a leading p.f. A contact arm on the disc makes contact with one of a pair of fixed contacts, disposed on either side of the central position, to bring in or out capacitor units to restore the load to unity power factor. The position of each contact may be varied to suit local requirements, the setting altering the angular displacement of the disc before contact is made. The range of settings may be extended by the use of tappings on the current coil which are brought out to a plug board.



Having a height of 11 in., width 9 in., and projection 9 in., this capacitor control relay by Ferranti has a case of cast aluminium

Fitted below the main induction element is an auxiliary relay energised by the closing of the "lag" contacts. Operation of the auxiliary unit closes the external circuit to a heavy duty capacitor contactor. The auxiliary relay is then "held on" until the "lead" contacts on the induction disc relay are made, which initiates the reverse sequence to disconnect the capacitor. To avoid vibration trouble, the auxiliary relay is d.c. energised from a metal rectifier supplied at 100 V from a small transformer.

Both "lead" and "lag" contacts are independently variable over a calibrated scale of 4% to 16% of the total re-active VA corresponding to the rated primary current of the c.t. and the supply voltage. With the use of the tappings mentioned earlier, the total range may be increased up to 80%. The use of hold-on contacts on the auxiliary relay affords protection to the "lead" and "lag" contacts, whilst the former's main contacts are stated to be of substantial design.

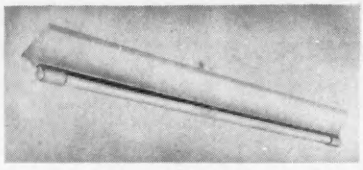
For the Electrical Trade

Improved "Mazda" Seagull Fitting

AN improved version of the Seagull 5 ft V-reflector fitting is now available from THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2.

Similar in appearance to the earlier version the improved "Seagull" is more easily installed and relamped, and is neater in appearance.

This sheet steel stove enamelled white fitting comprises a lamp gear tray enclosed by a V-shaped reflector channel. The tray can be attached to the ceiling by the "Pendicone" suspension system. In this way the fitting can be attached to two



Mazda's improved fitting

wood screws in the ceiling in under two minutes. The reflector channel is then attached to the gear tray by two captive knurled screws and is also held by chains for the convenience of installation and maintenance.

B.T.H. fixed lampholders, which have a particularly neat appearance, are mounted on the reflector channel.

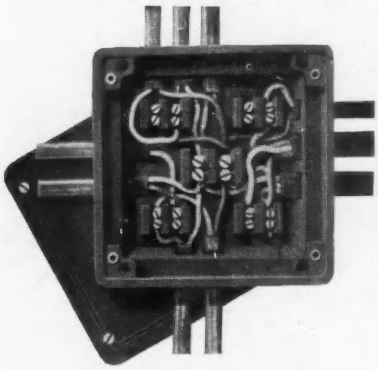
New "Duraplug" Products

FURTHER additions to the "Duraplug" range of rubber electrical accessories have been announced by W. W. HAFFENDEN LTD., Richborough Rubber Works, Sandwich, Kent.

These include a 13 amp 3-pin fused plug fitted with fuse to B.S.1362. Available in black or brown rubber, these are priced 4s. 3d. retail.

A 5 amp 3-pin panel mounting plug has been designed for permanent mounting on the side of apparatus and can be used with the firms weatherproof cable coupler socket. They are available in black only at 4s. 6d. each retail.

For rendering a live socket portion safe when not in use the firm has marketed a 5 amp cable coupler socket cover.



This rubber junction box is now available to the trade

In use this cover fits under the skirt of the coupler giving complete protection. In black, they cost 2s. 6d. each retail.

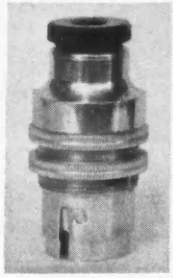
The last unit is a junction box moulded in rubber which was originally made to order for one of the Electricity Boards. It is now available for retail distribution at 12s. 6d. each, black only. The boxes were designed for the repetition wiring of small houses, all connections being made in two boxes, one in a central position for each floor, thus keeping installation time down.

As can be seen in the illustration there are two main terminals for phase and neutral and eight terminals for switch line connections. There is provision for the entry of 4 or 5 cables on each side.

A Heavy Duty Lampholder

MANY of our readers must be faced with the problem of finding suitable fittings for lighting installations which have to operate under conditions of frequent shock and incessant vibrations and on low voltage supplies.

The "T.A." lampholder designed and marketed for a number of years by SPERRYN AND CO., LTD., Moorsom St Works, Birmingham 6, will most certainly meet this need. Of heavy gauge brass the lampholder is soundly designed to provide a firm rigid purchase on the bayonet cap of the lamp. Originally designed for railway usage these holders will operate safely and continuously on low voltage supplies carrying up to 10 amps.



The T.A. for heavy duty

The special features of this lampholder include many that will commend themselves to our readers. First there is the black plastic insulating nipple for the cord grip, then a wedge type cord grip which holds each cable separately. The brass outer casing fits together firmly to provide a weatherproof cover for the porcelain insulating block and inner brass sleeve. Contact of the lamp cap terminals is ensured on the solid floating chisel end terminals by the pressure of a single heavy helical spring which does not itself carry current and therefore remains cool. The porcelain block holding the terminals and contacts is riveted to the inner brass sleeve which prevents the lamp being accidentally knocked out.

Erratum

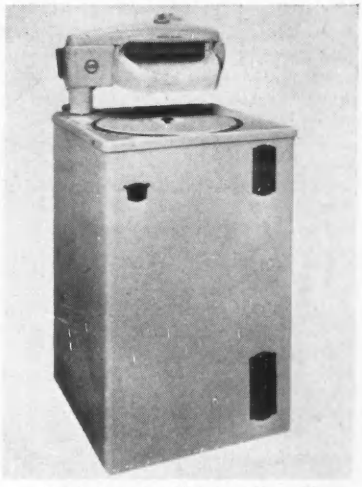
ON page 181 of our 4 Feb. issue we published details of a price change for one of the "Stella" television receivers. Unfortunately two errors found their way into our note. In the first place the model number should have read 8317U not 83170, and the new price should read 74 guineas which is a reduction of 5 guineas from 79 guineas which was the old price.

The New Thor 54H Washer

LATEST addition to the Thor range has been introduced by THOR APPLIANCES LTD., 64-66 Oxford St, W.1.

It is the 54H model washing machine, a "de luxe" unit which embodies heater, electric pump and power wringer. With its orthodox style cabinet body (and lid) finished in high grade white stove enamel, a vitreous enamel top and castors for easy movement the 54H has an 8 lb. capacity tub in speckled vitreous enamel in which the exclusive agitator produces fast efficient water action. A 2 kW immersion type water heater is fitted together with a high speed friction drive non-clogging impeller pump. A full size Acme power wringer with safety release is fitted and can be removed for the insertion of the post of a rotary ironer which is supplied as an extra at a total of £29. 3s. 10d.

The new machine measures 35 in. by 23 in. by 23 in., height increased to 47 in. with wringer. It is guaranteed for 12 months, with a special 2-year guarantee on the mechanism unit and costs £55. 2s. 6d. plus £20. 13s. 5d., a total of £75. 15s. 11d. (excluding ironer).



Thor's latest is a "de Luxe" model

NEWS OF THE WEEK

B.E.A. Amalgamate Two Divisions

Experiment in Decentralisation

THE North Western and the Merseyside and N. Wales generating Divisions of the B.E.A. are to be amalgamated, it was officially announced on Monday. This new operating unit to be known as the North West, Merseyside and N. Wales Division, will be inaugurated on 1st April. The announcement states that this amalgamation is in the nature of an experiment to obtain experience in the working of a larger unit than the existing Divisions. The new Division "will progressively be given increased responsibility for its operations in pursuance of the Authority's declared policy of decentralisation," the announcement states. Mr A. R. Cooper, formerly controller of the N. Western Division, becomes divisional controller of the new Division, with Mr P. Briggs, formerly controller of the Merseyside Division, his deputy. The changes consequent upon this administrative decision will be introduced gradually, and the salaries and wages of employees will not be adversely affected, we are assured.

In terms of generating capacity the N. Western was, and remains, the largest of the 14 Divisions, London excepted. The Merseyside Division was not the smallest, but the majority of its capacity was centred within a comparatively short radius of Liverpool. Installed capacity in the Merseyside Division was 902 MW, of which the Bromborough, Clarence Dock, Lister Drive and Wallasey stations accounted for 583 MW. Installed capacity in the 35 stations of the former N. Western Division was 2050 MW. Thus the new Division will have a total capacity of 2,952 MW and 55 power stations. These figures are based on last year's annual report of the B.E.A.

Industry asked to state their Educational Needs

THERE can be little doubt of the shortage of good technologists existing in this country at the present time. Similarly all are agreed that a primary need exists for technologists to keep abreast of current developments if Britain is to hold her own in international markets. These deficiencies can be solved by short part- or full-time courses of a higher technological character, and Colleges in all parts of Britain are willing to co-operate. In many instances, however, these lectures are very poorly supported.

Worried about this state of affairs the London and Home Counties Regional Advisory Council for Higher Technological Education called a press conference last Thursday. It was felt that the courses being run were either not sufficiently known, or were not those most required. Consequently, an appeal is being made to industry to specify their needs. Industrialists are asked to contact the Council stating what courses they would like, or what subjects would be most helpful for their technologists, now, or more important, perhaps, for the future. These courses can be arranged, whatever they may be, but the Council wants ideas and then support. This request is directed particularly to the electrical industry.

Firms are asked to communicate with the Council at Tavistock House South, Tavistock Sq, W.C.1. Although the appeal comes from the London body, it is equally applicable to the rest of the country where contact should be made with the Regional Council or Principal of the local Technical College.

LEB DISCUSSES ASSISTED WIRING SCHEME

THE VIEWS of London's borough councils having been obtained, a vote was taken at last week's meeting of the Metropolitan Borough's Standing Joint Committee on the subject of an assisted wiring scheme. The meeting voted in favour of asking the London Electricity Board to reintroduce a scheme whereby consumers can pay for the repair of the wiring in their homes by instalments.

As reported in our issue of November, the Committee has drawn attention to cases where the Board has found defective wiring systems and informed the consumer that it should be repaired. In many instances the landlord would accept no responsibility, and it appeared he was under no legal obligation, and the consumer was faced either with a large bill he could not afford, or his supply cut off.

An official of the L.E.B. told the ELECTRICAL TIMES last week that the matter was being investigated and discussed fully. The one big difficulty was finance, he said. The schemes ended because of Government restrictions on capital investment. No decision had yet been made and it was likely that the matter would have to be discussed at national level before it was possible to reach a conclusion.

New Company to Cope with Increased Business

FORMATION of a new company to take over the interests of Asea Electric Ltd., in Eire was announced last week. This new company will be known as Asea Electric (Ireland) Ltd., and will operate as from next Monday from 14 Mount St. Cres, Dublin. Managing director will be Mr J. A. V. McEvoy, who was formerly with the E.S.B. Hitherto the company's business has been carried on in Eire by E. C. Handcock Ltd., but the growing volume of business in that country together with the amount of plant already installed there by the Asea Group, warranted a special organisation under the direct control of the Principals.

Oxford St, London, duringCoronationweek? No, our picture was taken in George St, Sydney, during H.M. the Queen's tour of Australia. One of the first photographs to reach this country, it shows one of the city's premier stores, Anthony Horden and Sons Ltd., illuminated by floodlights and Chrysaline devices supplied by the General Electric Co. Pty. Ltd.

Russian Trip was Most Satisfactory

£700,000 SWITCHGEAR ORDER PLACED—MORE TO FOLLOW

IT IS still not possible, at the time of going to press, to gain a clear picture of the results achieved following the trade visit to Moscow. The majority of the 33 representatives of British industry, including the electrical industry, who set out with the main party, are now back in this country. One order which has definitely been placed is valued at £700,000 and involves switchgear. This was gained by Crompton Parkinson Ltd., and the work will be executed at the company's Chelmsford works. All orders placed, and they are stated to be worth some £16 millions altogether, date from 1 January next. The Russians are willing to spend another £400 millions in the three years from 1955, and have made no attempt to hide the fact that they need the equipment for their development programmes, are more than willing to buy, and will welcome those willing to sell.

No news has been forthcoming as yet from Enfield Cables, represented by the Earl of Verulam; Lancashire Dynamo and Crypto, represented by Mr F. F. H. Schroeder; Mullard Overseas, whose representatives were Mr A. F. Jeans and Dr R. C. G. Williams; or from Johnson and Phillips. Mr W. Glass of the last mentioned company is back but Mr J. B. McRostie is still in Moscow. Another member of the party still negotiating is Crompton's Mr D. E. Graham. Mr S. Lane of the Brush Group of Companies is calling at Warsaw, and is due back later this week, we understand.

On his return to the U.K. early last week, Mr J. B. Scott echoed the views of all delegates when he said the mission had been most satisfactory. The Russians had been tremendously hospitable and the whole trip well organised. They were keen and meticulous in their negotiations, knowing exactly what they wanted and what they wished to pay for each article. Their knowledge of current world prices could hardly be bettered. In the course of his stay in Russia, Mr Scott also visited Stalingrad and saw over a cable factory where general cable and production facilities were some of the best in the world.

Some of the businessmen on the trade mission were due to meet officials of the B.o.T. last weekend to discuss experiences.

Ideal Home Electric Cooker Competition

ONCE again the British National Electrics Ltd. are running their electric cooker competition at the *Daily Mail* Ideal Home Exhibition. Last year's most successful competition was based on the public's preference for various features of the company's C.49 model. The competitor is asked to place in order of importance ten selected predominant features and the winner is he (or she) who in the judge's opinion submits the best entry. The prize comprises one of the cookers, a water heater and a reflector fire, but should the winner have ordered any of these appliances already, money will be refunded and a kettle, toaster and set of saucepans presented as well. There is a separate section for boys and girls under 16, the prize being a bicycle. Competition will run from 2 Mar. to 5 Apr. Electricity Boards and dealers may obtain publicity media and entry forms on request.

NEW STRIKE TACTICS

NEW tactics were adopted by the Electrical Trades Union this week in its strikes demanding an increase in pay for electricians in the contracting industry. Employees of particular firms have been instructed to strike, some for a limited period and others for an indefinite time. Two of the firms are Barlow and Young Ltd., and Troughton and Young Ltd., whose operatives work in London and the provinces; altogether about 900 men are involved, it is stated. There have been some reports that individual firms have agreed with the E.T.U. to pay increased wages to electricians, but Mr L. C. Penwill, director and secretary of the N.F.E.A., states that no member of that association made such an agreement.

Faraday Lecture Surveys Electrical Heating

SPEED and flexibility of control are the two great advantages offered by electrical methods of heating, and in recent years good use has been made of them in industry. Some of the methods which are used were demonstrated in the Faraday Lecture, which was delivered in London last week by Mr O. W. Humphreys, B.SC., F.INST.P., M.I.E.E. (Director, G.E.C. Research Laboratories). The types of process with which he dealt included radiant heat for drying paint and softening plastics, h.f. heating for hardening steel and setting synthetic glues, heat treatment furnaces, and the joining of metals by techniques such as h.f. brazing and argon arc welding. Besides a number of demonstrations to illustrate his lecture, Mr Humphreys presented colour films of processes in operation in factory and laboratory.

OFFICIAL PUBLICATIONS

MINES. Report of H. M. Inspectors of Mines for 1952. N. Western Div. H.M.S.O. 1s. 9d.

DEFENCE SPECIF. DEF-15. Vulcanised Rubber Insulation for Conductors of electric Cables and Wires (for use of Govt. Depts.). H.M.S.O. 1s.

BRITISH STANDARD. B.S. 376, Part 2: Railway Signalling Symbols; Part 2: Wiring Symbols and Written Circuits.

Further Relaxation in Australian Import Controls

AN extra £A25 millions worth of goods is expected to be imported into Australia as a result of further relaxation in controls announced by the Prime Minister and Minister of Customs towards the end of last week. The changes affect imports from countries other than dollar areas and Japan, and will operate as from 1 Apr. This, the fourth relaxation since the imposition of controls in March, 1952, was anticipated in our 24 Dec. issue. It follows the changes announced last Sept.

Principal aspects of the recent relaxations are threefold. A large number of goods have been transferred to a "no quota" restriction basis. The former category A classification has been deleted from the licensing schedule because most of the goods covered have now been placed in the "no quota" restriction class, and the few remaining will be controlled on an administrative basis. As regards Category B goods, the level of imports has been raised from 50% to 60% of the value of imports in the base year (ended June, 1951). Senator O'Sullivan said that goods transferred to a "no quota" restriction basis would be licensed without restriction on application, provided it was shown that goods were available for importation within a year from 1 Apr.

Electrical commodities under the new classification include components for telephone equipment and for making lamps, deaf aids, air conditioning and refrigeration machinery parts, certain resistance wires, portable hand tools, certain fans, fittings not containing metal, certain telephone and telegraphic equipment, certain measuring and recording instruments, valves, and porcelain ware for electrical purposes. Among items placed on an administrative basis but with no change in the current rate of licences are a.c. Watt hour meters, sodium vapour, mercury vapour and certain other types of lamps. Articles in Category B include most electrical domestic appliances.

A list of goods on which restrictions on imports from Japan would be relaxed will be issued about 1 Apr.

150 m.p.h. Electric Train

THE French electric locomotive C.C. 7121 has established a new world rail speed record of 150 m.p.h. Previously in the course of its three-day speed trials between Dijon and Beaune the locomotive had achieved speeds of 138 m.p.h. and 143 m.p.h. The C.C. 7121 is a standard 4,500 h.p. mixed traffic vehicle weighing 104 tons. It was built in 1949 and at present hauls passenger trains between Paris and Lyons. On its record run it was drawing three coaches.

Second Exhibition of Arts and Crafts

IT is three years since the electricity supply industry's first national Exhibition of Arts and Crafts was held at the Old Horticultural Hall, London, S.W.1. The second such display of the results of the industry's spare time occupations and hobbies opened at the same venue last Friday. Once again the exhibits were of a remarkably high standard. There were 950 of them altogether, ranging from furniture and carpets to paintings and photographs; some 30 sections. Prior to this national exhibition there had been 61 local or district competitions involving over 1,200 entries. All the selected 950 items finally displayed were prize-winners at one stage. Lord Citrine opened the exhibition which will remain on view until Saturday.

Shop Windows at B.I.F.

VISITORS to previous B.I.F.s will probably recall the many shop windows at Olympia, provided at the request of manufacturers who could not afford the time or staff to man a stand. This idea has proved so popular that it is being extended and a total of 165 windows are being offered to exhibitors initially.

Inverness pioneers Domestic Floor Heating

SPACE heating of houses by electric elements and cables embedded in the floors is now being developed by the N. of Scotland Hydro-Electric Board co-operating with the Burgh Architect of Inverness. There are now five privately owned houses in the town heated in this way and three blocks of all-electric flats now being built will also embody the same system.

The burgh architect is Mr J. Blackburn. He designed and built the first of these houses for himself. Heating is thermostatically controlled and special insulating materials are used in the walls and roofs to conserve heat. The system has proved most satisfactory. Cost of the installation is between £69 and £117, which is in fact a saving when compared with the cost of building two fireplaces and chimney. Principal advantages found by the owners of this method of heating are that there is a big increase in floor area, no draughts, no wasted heat, and an even temperature throughout the rooms. In addition, of course, there is no danger of children or furniture being burnt, no fire-lighting, no ash-disposal problems, and absence of dust.

Microfilm of "Electrical Times"

VOLUMES 121 and 122 of the ELECTRICAL TIMES covering the whole of 1952 have now been filmed by University Microfilms, Ann Arbor, Michigan. The two reels of film are exceptionally compact and are admirable for filing and record purposes. Copies are available from University Microfilms at $11.60.

DEFECTIVE EARTHING

Dealer pays Damages but Board not Liable

DAMAGES of £530. 6s. were awarded at York Assizes last week to a man whose wife was electrocuted while using a wash boiler. The man sought judgment against both a Pickering electrical dealer who installed the appliance, and the N.E. Electricity Board. Mr Justice Pearson gave judgment in his favour against the dealer but said there was no liability on the part of the Board. In evidence, a consulting engineer said the insulation between the elements and the shell of the boiler were defective, and the accident occurred because the earthing was quite inadequate.

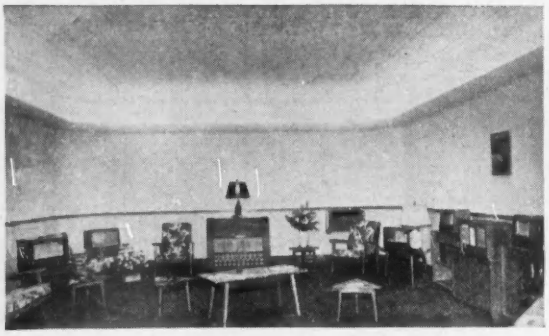
In his summing-up, the Judge bore out this view. He said the dealer was liable because he contracted to install the apparatus in a proper manner and make it safe. He failed to do so. It was dangerous to install a stake method of earthing without due regard to local conditions of soil. It had been suggested that the defendant was entitled to rely on full tests by the Electricity Board, but the Board's tests were not such that would have disclosed the defects, nor were there grounds for supposing that the Board would carry out such tests.

Mr Justice Pearson went on to say that the Board had done nothing wrong. The only omission was that there was no test for adequacy of the earthing system, he said. It was too much to say that the Board was responsible for what the occupier might have done to his own chattels on his own premises.

New British Showrooms opened in Singapore

INCREASED use of electricity in Malaya and the consequential increase in the prospects of selling British electrical appliances immediately suggests better promotional activities in that country. The General Electric Co. has been represented there for some 50 years but have recently opened new premises in Bukit Timah, Singapore, to cater for the increased business. This new Magnet House, comprising modern showrooms, stores and offices and workshops was officially opened by Mr Leslie Gamage, vice-chairman and joint managing directors of the company who is on a six weeks' tour of branches in Asia.

There are two main workshops, one for servicing radio and telephonic equipment, and second for work on refrigerators and general equipment. The latter inspects refrigerators on arrival after shipment, and also provides facilities for overhauling other appliances, and for testing and repairing meters. A test bay is to be installed for diesel engines, alternators, motors and ventilation equipment under full load. Two features of these new premises are the particularly attractive industrial showroom inside the main entrance and the radio demonstration room. The latter is air-conditioned, has indirect cornice lighting and is lined with acoustic tiles.



Left is the radio demonstration room at the new G.E.C. showrooms in Singapore. Above, Mr. Leslie Gamage proposes a toast at the opening ceremony. On his right is Mrs Steed, and on his left Mr P. H. Steed, general manager in Malaya, and the Hon. Mrs Leslie Gamage

The First Half-Century

The decision of Mr Justice Channell in the case of Parker v. the L.C.C. brings out a point of law not generally known. Parker was injured in a tramcar accident, admittedly through the neglect of the driver, and he brings an action for damages. But the L.C.C. cited in defence the first section of the Public Authorities Protection Act which provided that no action shall lie unless commenced within six months, and the Judge found their interpretation of the Act good in law. There can be little doubt that this Act was passed for the protection of public officials, not at all to give a trading municipality an advantage over companies engaged in the industry or a way of evading its ordinary liabilities. The moral for the public is to send for the lawyer as soon as the doctor has gone.—*From our issue of 25 Feb. 1904.*

Production and Productivity at A.D.M. Dinner

BECAUSE of lack of encouragement, there is an increasing tendency for the productive genius which Britain has always been able to produce to export itself overseas. Such was the opening theme of Lord Sempill's speech in proposing "The Associated Dynamo and Motor Manufacturers" at the A.D.M. dinner last week at the Trocadero. Lord Sempill, A.F.C., a Past President of the Institute of Production Engineers, was much concerned with both production and productivity. In the latter respect he complimented the B.E.A. on its increasing generation efficiency.

Mr J. S. Ramsden, M.I.E.E., in reply, defended the Association against ill-informed criticism, pointing out that in its 24 years, the Association had not abused its authority, even if it had power to do so. In similar vein, the chairman, Mr. F. H. Schroeder, in proposing "The Guests," discussed the considerable unproductive work entailed in obtaining figures for the Monopolies Enquiry Commission. Lt.-Gen. Sir Thomas Hutton, K.C.I.E., C.B., M.C., Director of the British Productivity Council replied.

Golden Jubilee

A NOTEWORTHY golden jubilee is being celebrated this year. The firm to be congratulated is Gailey and Roberts Ltd., now owned by the United Africa Co. It was 50 years ago that James Gailey and D. O. Roberts were surveying the railroad from Mombasa to Uganda, and recognised the potentialities of the newly founded protectorates of Kenya, Uganda and Tanganyika. As from that time they have acted as importing agents for Britain's electrical supplies in the area.

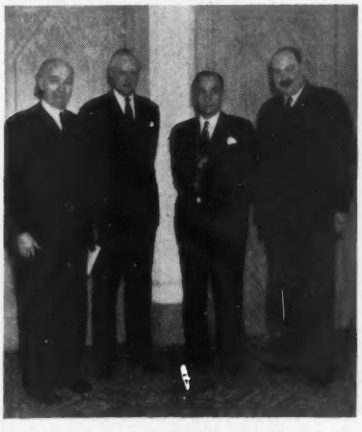
NUCLEAR PHYSICS RELEASES

INFORMATION on the peaceful uses of nuclear energy often seems to be blocked unnecessarily. In a recent statement issued by the Department of Atomic Energy, it is explained that the major difficulty as far as power producing reactors are concerned, is that no sharp dividing line can be drawn between reactors of this type and those for plutonium production for military purposes. It was agreed some time ago, however, that information required for studies of the economics of power reactors should as far as possible be released. It has been agreed in particular that information can be given on many of the processes carried on at the Windscale and Capenhurst Works, while keeping secret the production technology of certain critically important materials. Some of the older production processes for heavy water and graphite and for the reduction of uranium compounds to metal are included. All information on the neutron cross-sections of carbon and graphite has been declassified.

A corner of Falk Stadelmann's new Manchester showrooms where contemporary fittings are displayed to good effect

Commercial Travellers Playing their Part

THE present day commercial traveller in the electrical industry had the technical knowledge required to sell the great variety of goods now on the market, stressed Mr T. B. O. Kerr, president of the Electrical Trades' Commercial Travellers' Association, at the annual luncheon last Thursday. Earlier, Mr J. Eccles, deputy chairman (operations) of the B.E.A., referred to the strong link between the Supply Industry and the commercial travellers. The latter were stimulating the sale of apparatus, enabling the B.E.A. to sell more electricity and keep down its price. The toast of "Our Guests" was proposed by Mr A. C. Franklin, and replied to by Mr H. H. Armytage on behalf of the E.W.F. of Bradford. Afterwards, Mr F. N. Woods proposed the toast of "The Chairman," to which Mr E. J. Shuter, in replying, expressed pleasure at the record attendance at the function, and at the collection of £160 for the benevolent funds. The value of the Association in aiding the E.I.B.A. and the Royal Commercial Travellers' School, apart from other benevolent work, was stressed by all the speakers. The Association's 1954 Gala Ball is to take place at the Criterion on 1 Oct.



Messrs J. Eccles, T. B. O. Kerr, E. J. Shuter and H. H. Armytage, pictured at the Commercial Travellers' luncheon last week

Contemporary Lighting Fittings Featured

FOUR branches of Falk Stadelmann and Co., Ltd. have been specially prepared recently to feature their new range of contemporary lighting fittings designed by Mr J. M. Barnicott. The displays are at Leeds, Newcastle, Manchester and Cardiff. The Manchester showrooms were opened only a short time ago. These particular displays have been produced to coincide with the company's publication of their catalogue 800 listing these same fittings. Needless to say, electrical engineers, consultants and others interested in this style of fittings will be welcomed at any of the showrooms where technical staff are available to discuss problems and offer advice in the preparation of schemes.

Jute Mill Lighting

IN the article on the Adamjee Jute Mills which appeared in our issue of 11 Feb., we described the use of channel conduit in supplying the extensive fluorescent lighting installation. We would like to make it clear that this conduit was supplied by Messrs Channel Conduits Ltd., of 11 Victoria St, London, S.W.1.

NEWS IN BRIEF

During 1953 there were 28,543 new registrations under the Registration of Business Names Act, bringing the total number to 653,531.

Export order received by Winston Electronics Ltd. recently and placed by the French Scientific Office in London, included two Spectrographic Monitors for Commissariat à L'Energy Atomique, Paris.

International Trade Fair at Sao Paulo, Brazil, has been postponed from 9 July to 7 Sept. Fourth Centenary Exhibition will open on 9 July as previously intended.

Selling price of tungsten ores of standard 65% grade and ordinary quality have been reduced to 120s. for Wolframite and 115s. for Scheelite, per long ton delivered consumers' works.

New London showrooms are being opened by Chilton Electric Products Ltd., at 19 Old Queen St, S.W.1.

COMPANY ACTIVITIES

IN a year when the electrical manufacturing industry faced greater export difficulties, the English Electric group did well to increase its consolidated profits, before tax, by 10% to £4·8 million. It is true that the capital was increased by several millions by a share issue and ultimately doubled by a bonus issue. But the resources provided by the former would hardly have had time to pay their way. Benefits from the new money should come in the current year. A heavier tax charge, some £316,000 higher at 3·2 million, reduced the increase in the net profit to 7%, making it £1·6 million.

The dividend payment is rather involved because of the change in capital but actually it works out at the equivalent rate of the previous year's 15%. It was covered nearly three times by earnings. The fact that there was no dividend increase somewhat disappointed the market, and the immediate impact was a fall of 1s. 6d. in the £1 Ordinary units to 41s.

A different story is told by Taylor Tunnicliff (Electrical Industries). In that case the trading and other receipts fell by £31,000 to £393,000. Here the tax cushion eased the situation. Many companies, owing to the intervention of the cushion, are able to report higher net earnings despite lower trading results. Taylor Tunnicliff's tax was £43,000 lower at £164,000, which left a £6,000 rise in the net profit figure at £164,000.

After allowing for the 1953 scrip issue of 100%, the dividend of 12½% means that in effect payment is being maintained. Earnings are already four times the amount required to pay that distribution, indicating commendable caution.

In the present year the company should benefit from the Government's now less stringent views about capital development programmes, through its specialist manufacture of insulators and porcelains.

Competition from German cameras upset the programme of Peto Scott Electrical Instruments in the year to 30 June last. It made a loss of £57,663 against a profit of £32,620. The net loss before tax was £38,364 against £19,861 profit. This was after crediting fire insurance claim, £33,914 (nil) and debiting depreciation of £7,257 compared with £6,243, but there was nothing to pay for taxation, against £10,547. The German competition, according to the chairman Mr M. Campbell Jones, meant suspending production of the company's "Witness" camera, and stocks of this camera have now been written down to nominal value.

Undaunted, he states that new policies have been undertaken which have led to an increased turnover in the first half of the current trading year as compared with the corresponding six months. Trading profits for the period December last are about £20,000 subject to audit. The company is now concentrating on the production of electrical and T.V. equipment and has completely discontinued camera production.—*From our City Correspondent.*

Associated British Engineering Ltd.

This company has agreed to sell its holding of 2 million Ordinary shares of the Brush Electrical Engineering Co., to Thomas Tilling Ltd., the concern which since disposing of its bus interests, has developed into an industrial holding company. The sale is being made at the current market price. The issue capital of the Brush Co. amounts to £5 million, comprised of £1,660,000 5½% Cumulative Preference stock, £940,000 6% Cumulative Convertible Redeemable Preference stock and £2,400,000 Ordinary stock.

Thomas and Bolton and Sons

This copper concern reports a severe setback in profits for 1953. The provisional trading profit of the company, which is controlled by British Insulated Callender's Cables Ltd., is down to £381,819 compared with £799,807 for the previous year. The final dividend is 10%, again making a total of 12½%.

Hubert Davies and Co.

With a final dividend of 20% this well-known South African firm again makes a total distribution of 27½% for the year to 31 Oct. last. The profit for that year, at £403,136 is £88,031 lower than for the previous period. After taxation, etc., the respective totals are £281,837 and £304,600.

Desoutter Brothers (Holdings)

For the year ended 31 Dec. last the group profit after taxation is £127,938, nearly double that of the previous year. A final Ordinary dividend of 12½% makes a total of 20% for the year—2% more than for 1952.

Enfield Rolling Mills Ltd.

The directors in proposing a four for five scrip issue, emphasise that this must not be regarded as implying an increased dividend distribution for the year ended 31 Dec. last.

English Electric Co. Ltd.

After all charges other than taxation, the group profit for the year to 26 Dec. last is £4,779,920—an increase of £420,896. Deducting increased taxation, the profit becomes £1,553,897 (*£1,449,518*). There is a final dividend of 6¾% which absorbs £389,260, compared with £278,675 required by the 10% final a year previously on capital prior to the 50% capital bonus given with the interim dividend last year.

S. Guiterman and Co.

Although the consolidated net profit, before tax, for 1953, at £8,933 is £6,227 below that of the previous year, the dividend is again to be 7½%.

Hartley Electromotives

This concern and its associated and subsidiary companies are to be amalgamated with Baird Television Ltd. The shareholders of the latter concern have been informed that their interests would best be served by effecting the amalgamation. Apparently, a provisional contract has been entered into to acquire the entire issued capitals of Hartley Electromotives Ltd., Hartley Installations Ltd., and Duratube and Wire Ltd., the three principal companies in the group. The consideration is to be the issue of 200,000 6½% Cumulative Redeemable £1 Preference and 2 million "A" Ordinary 1s. shares, the latter to rank for two-thirds of divisible profits after Preference payments. The existing 5,840,000 Ordinary in issue will become "B" Ordinary and rank for one-third of any divisible surplus. Although future profits of the Hartley group will be available to Bairds, the directors point out that the payment of dividends may not be possible for some time because of the necessity to deal with accumulated past losses amounting to over £250,000 at 31 Mar. last. In order to effect the amalgamation it will be necessary to increase Baird's authorised capital to £800,000 and to reorganise it so as to consist of 200,000 6½% £1 Preference, 2 million "A" 1s. Ordinary 6,173,333 "B" 1s. Ordinary and 3,826,667 Ordinary 1s. shares. Consent of the Capital Issues Committee has been obtained. A meeting is called for 15 Mar. to consider the proposals. It is proposed to change the name of the company to Hartley, Baird, Ltd. On the merger becoming effective, Mr R. G. Cooke will join the board as deputy chairman. Mr A. W. M. Hartley as managing director, Mr J. W. McFetridge as financial director, and Mr F. M. Hamer also representing the Hartley Interests. Sir Charles King, while remaining chairman of Baird Television, will join the boards of the three main firms in the Hartley group.

International Combustion (Holdings)

With a final dividend of 15% the total distribution for the year ended 30 Sept. last has been maintained at 20% on the capital which was increased by a 100% free scrip issue. For the previous year 20% was paid but included an interim of 10% on the previous smaller capital. According to the preliminary report, the group profit for the year, before taxation, is £1,627,916 compared with £1,580,403 for the previous period. The net profit is £528,222 (*£464,642*).

Marconi International Marine Communication Co.

The profit for 1953 is £290,265 (*£337,093*) after allowing all charges other than taxation. The final dividend of 6% again makes a total of 10%.

Marconi's Wireless Telegraph Co.

The Ordinary dividend for the year ended 26 Dec. last is again 7%. After all charges other than taxation, the profit for the year is £862,283 as against £576,704 for the preceding year.

Mather & Platt Ltd.

The consolidated profit for the past year is £1,604,772 compared with £1,600,295 for the previous period. After charging taxation, and £200,000 to stock in trade contingency reserve, the balance is £558,060 (*£428,790*). With a final Ordinary dividend of 6%, the distribution for the year is again 10%.

Peto Scott Electrical Instruments Ltd.

This concern reports a loss for the year ended 30 June last and no dividend is proposed, although in the previous year 12½% was paid. The year's loss is £57,663 in contrast with a profit of £32,620 for the previous year. The net loss, before taxation, is £38,364, after crediting the fire insurance claim of £33,914 (*nil*).

R. B. Pullin and Co. Ltd.

Although this company and its subsidiaries achieved a modest increase in trading profit, taxation has reduced the net profit, it will be seen from our accompanying table. Mr. R. B. Pullin, the chairman, intimates that notice has been given to purchase the remaining shares in Stanley Cox Ltd., and when the formalities are completed the latter concern will become a fully-owned subsidiary of Pullin's.

Year to 30 Sept.	£ Trading Profit	£ Net Profit	% on Earned	Ord. Paid	Ord. High	Price Low
1949	60,843	23,858	43	10	3/1	1/9
1950	58,174	12,219	22	15	3/9	2/4
1951	87,101	31,405	60	15	4/1	3/–
1952	114,907	34,361	65	15	3/3	2/6
1953	121,626	29,397	29	15	4/4	2/7

Taylor Tunnicliff (Electrical Industries)

On the capital which was doubled by a scrip issue, the dividend for the year ended 31 Dec. last is 12½%—equal to the 25% paid in 1952. The group profit amounts to £393,293, against £423,870 for the year previously, and after charging taxation, etc., the net profit becomes £163,887 (*£157,655*).

Waygood-Otis Ltd.

This concern of lift and escalator manufacturers reports a sharp increase in trading profit for the year to 31 Dec. last. At £587,916, the profit for the year is £205,790 up on the previous year. The dividend has also been raised by 10% to a total of 65%, of which the final dividend is 25%.

Dividends Declared

Greengate and Irwell Rubber Co.—Final dividend of 20% making a total of 30% (25%) for the year.

Lightfoot Refrigeration.—Interim of 3% (same).

Richard Johnson Clapham and Norris.—Interim of 2½% (*same*).

QUESTIONS IN PARLIAMENT

Export Credits

ON Thursday, last week, Mr de Freitas asked if any changes were contemplated in the policy of the Export Credits Guarantee Department to make it easier for our firms to compete in the export trade, particularly with German and Italian exporters. The President of the Board of Trade told him that credit insurance institutions provided in this country were probably about the most helpful range of guarantees. If, however, there was any special extension of E.C.G.D facilities which Mr de Freitas had in mind, he would be pleased to learn of it.

TV in the Highlands

REPLYING to Mr J. Grimond, Mr D. Gammans said it was extremely unlikely that the new television station in the Highlands of Scotland would cover Orkney or Shetland.

Television Coverage

ESTIMATED television coverage of the population of England, Scotland and Wales, and the number of licences taken out was given by Mr D. Gammans in a written answer last week, in reply to Mr Ness Edwards. He said the coverage was 35·4 million persons in England, 4 million in Scotland, and 2·1 million in Wales. The corresponding licence figures were about 2·7 million, 125,000 and 107,000.

Income Groups

FURTHER information was sought by Mr Hamilton concerning the proportion of income spent by various income groups on various commodities and services, including fuel. Mr R. Maudling had to tell him, however, that no official statistics were available giving such information on different income groups. Later, however, he said the Ministry of Labour's household budget enquiry, now being compiled, would probably provide figures of the kind sought.

Air Pollution

POWERS of local authorities to deal with atmospheric pollution were not sufficient, alleged Mr A. Palmer last week. He suggested that legislation of a general character to strengthen those powers be introduced, but was told this was one of the matters being considered by the Committee on Air Pollution and any further action must await the publication of the Committee's report.

Trade Visit to Russia

REPLYING to questions by Mr H. Wilson last week, Mr. D. Heathcote Amory said the list of goods Russia was interested in buying from the U.K. had been studied and although it was not sufficiently specific to make exact calculations as regards items subject to strategic control, it had been roughly estimated that rather less than half of the business would be found free from those controls. This would amount to about £180 millions. Later he said discussions would take place between the Government Department and the delegates to Moscow in the near future.

N.C.B. Fuel Consumption

THE saving of coal effected by the replacement of colliery steam-raising plant by taking power from the national grid was the subject of a question by Mr R. J. Taylor. He also asked what the saving in coal will be when electrification was completed. Mr Geoffrey Lloyd said that in the four years up to 1952 the board's consumption of electricity rose by 775 million units and coal consumption fell by one million tons.

Rural Electrification

THE Minister of Fuel and Power made a statement last week on the progress in rural electrification. He said that since the Government's approval of an increase in capital and his own consultations with Area Board chairmen, there had been a considerable increase in the number of farms connected. As compared with the previous year, the number rose during the last six months of 1953 by 32% and in the last quarter of that year the figure was 4,465, or 41% greater than the corresponding 1952 figure. This he said was a record achievement. In addition some 60,000 other rural premises had been connected during the year.

The Minister went on to say that those figures showed how the pace of rural development had been increased. The Boards were now making preparations to carry electricity to the more remote areas.

Rural Supplies in Scotland

COMPARATIVE development of rural electricity supplies between Scotland and the remainder of Britain was sought on Monday by Cdr Donaldson. He referred particularly to the financial year 1953-54. Replying, the Secretary of State for Scotland said he was informed that 2,239 farms in Scotland had been given a supply for the first time in 1953, compared with 11,172 farms in England and Wales. These figures he said were 6·4% and 4·2% of the total number of farms in Scotland and in England and Wales respectively. The Minister went on to say that in addition 2,107 crofts in the N. of Scotland District were connected to mains during the same year.

ELECTRIC SUPPLY NEWS

Argyll

THE North of Scotland Hydro-Electric Board announce that consumers in the mainland part of the Board's Dalriada Area—Kintyre and Knapdale in Argyll —are to pay less for their electricity. The electricity supplies for these districts previously have been produced mainly from diesel generators but as a result of recent extensions to the Highland Grid, they are now supplied by water power. The Board's water power tariff will apply to the districts from the date of the first meter reading after 22 Feb. (The water power block tariff makes electricity available to domestic consumers at 5½d., 1d., ½d. and ½d. per unit in winter compared with 6d., 1d. and ½d. per unit under the diesel tariff.)

Beaminster

THE Minister of Fuel and Power has upheld the Rural District Council's objection to the placing of power lines above ground at Gerrards Green and Woodswater Lane. The South Western Electricity Board had asked for the Minister's consent to erect the lines to provide a supply to two housing estates. The Board had proposed to afford the supply by the cheapest method—straight along the front of the houses. An inquiry was held last month by Mr A. H. F. Linton into the objections of the R.D.C. and the Dorset County Council.

Belfast

DESPITE attempts by a few members to hold up the Electricity (Essential Supplies) Bill in the Northern Ireland Parliament, its passage through the House was completed last Thursday. In moving the second reading of the Bill which, as we noted last week, transfers from Belfast Corporation to the chairman of the Joint Electricity Committee for Northern Ireland, authority to place contracts for plant and equipment for extensions to the new West power station, Lord Glentoran, Minister of Commerce, said that independent advisers had stated that unless work was started before 1 May there would be a grave deficiency of plant in 1957-58. After referring to "successive deferments" of a decision on the placing of contracts, the Minister said that it was evident from a recent resolution of the Belfast council, asking the Minister to promote legislation, that difficulty in reaching a decision in the council on these contracts would still be experienced even now. He agreed that the council should take care in placing contracts, but what was now of prime importance was the effect in the present case on industry and consumers generally throughout the Province. He emphasised that the Bill was strictly limited to get over the practical difficulty which had arisen in the council coming to a prompt and unassailable decision. The Corporation would still remain responsible for managing their electricity undertaking generally and for carrying out schemes. The Bill is likely to be dealt with by the Senate this week.

At its meeting on 1 Mar. the City Council will consider a motion, put forward by Alderman McKee, requesting the Government to hold a sworn inquiry into the circumstances which have caused delay in the placing of certain power plant contracts.

Bournemouth

THE proposal of the Southern Electricity Board to erect a 3·3 kV cable across the River Stour at Stourpaine, was discussed at a meeting of the Avon and Dorset River Board. A land drainage committee minute reported that the Electricity Board had proposed a clearance of 25 ft and the River Board's chief engineer, Mr W. H. Crocker, had suggested the clearance should be 40 ft to enable a dragline of appropriate size to be used in future dredging operations at that point. The Electricity Board had then claimed from the River Board £50 in view of the extra height specified. It was stated that the matter had been taken up with the River Boards' Association.

Carlisle

THE City Council has reached agreement with the British Electricity Authority concerning money held by the Corporation in respect of its electricity undertaking, at the time of nationalisation, as a result of which the Corporation will receive £168,567, we learn. Mr T. L. MacDonald, chairman of the Finance and Properties Committee, stated at a meeting of the City Council that when the transfer of the electricity undertaking took place on nationalisation, difficulties arose about the disposal of money placed in the suspense account. There had been many months' discussion on the matter and he expressed satisfaction that an agreement had been reached. He also expressed appreciation at the public-spirited way in which the B.E.A. had dealt with the subject. A writ originally issued against the Corporation by the B.E.A. had been withdrawn.

In the earlier discussions, the Authority claimed that over a period of nearly 30 years the Corporation had charged to the revenue account of their former electricity undertaking income tax payable on the profits of the undertaking without setting against that liability income tax deducted from interest and other annual payments of the undertaking, and that the accumulated sum of the excess amounts so charged to the undertaking were held by the Corporation at vesting day.

Dunstable

A RESOLUTION calling for the "most vigorous resistance against proposals to route the B.E.A.'s 275 kV overhead transmission line through Dunstable" was passed at the town's meeting last week.

Houghton-le-Spring

THE Urban Council has been informed of proposed steps to improve the supply of electricity in the Shirley Row district. At present, this area is still supplied from networks owned by the National Coal Board, and the North-Eastern Electricity Board is investigating the possibility of providing a supply from its system to some of the networks in the area owned by the Coal Board. The Electricity Board estimates that it would take six months to carry out this work.

Sayings OF THE WEEK

"In the development of certain intricate engineering products it was possibly correct that there should be rings, because one manufacturer was not going to take on himself the whole burden and cost of developing a new form of equipment when he had in mind that other firms were going to use his product in a modified form" . . . CAPT. HENDERSON speaking in N. Ireland House of Commons, in the debate on the Electricity (Essential Supplies) Bill.

"I do not take my hat off to the Germans—I take my coat off," . . . a Northern machinery manufacturer comments in the "Challenge to Industry" survey in *The Manchester Guardian.*

"We believe that we shall get the best set-up if we can have two-tier organisations, and if we can restore the district or local manager to his old position of authority." . . . MR J. MOULD, deputy chairman of the East Midlands Electricity Board, speaking at a school for staffs.

LIGHTING SCHEMES

Ashington. A street lighting improvement scheme, proposed by the Urban Council at a cost of £5,985, will involve the provision of another 59 street lamps in five areas.

Dungannon. The R.D.C. has asked the Electricity Board for Northern Ireland to furnish plans for improved public lighting in Coalisland and 11 villages.

Gosforth (Northumberland). The Urban Council is seeking loan sanction for £6,102 for proposed street lighting developments.

Grangemouth. The Lighting Committee is to make further investigations concerning the possibility of installing sodium discharge lamps in streets.

Hinckley. The U.D.C. has been recommended to adopt a new street lighting scheme, involving 162 new lamps, at a cost of £3,286.

COMMERCIAL INFORMATION

Contracts Open at Home . . .

Dates given are the final for receipt of tenders, unless otherwise stated.

26 Feb.—Belfast T.C. Chains for cranes, condenser tubes and tube plate ferrules. —Advertised in 11 Feb. issue.

26 Feb.—Carlow (Eire). Internal telephone in offices of County Council.—See 11 Feb. issue.

26 Feb.—Donegal. Installation in county hospital at Letterkenny.—See 4 Feb. issue.

26 Feb.—Manchester T.C. Installation in 269 houses at Middleton. Advertised in 18 Feb. issue.

26 Feb.—Westhoughton U.D.C. Lamps during year from 1 Apr.—See 11 Feb. issue.

27 Feb.—Aireborough U.D.C. Street lighting along 3 streets.—Advertised in 4 Feb. issue.

27 Feb.—Edinburgh. Electrical services for year beginning 1 Apr. at Gogarburn M.D. Instn.—See 11 Feb. issue.

27 Feb.—Horwich U.D.C. Tungsten and sodium lamps in vear from 1 Apr.—See 18 Feb. issue.

27 Feb.—Irlam U.D.C. Supply of lamps during 1954-55.—See 4 Feb. issue.

27 Feb.—Merthyr Tydfil T.C. Electrical goods in year beginning 1 Apr.—See 11 Feb. issue.

27 Feb.—Midlothian. Concrete columns for street lighting along Carlisle Rd.—See 18 Feb. issue.

27 Feb.—Weston-super-Mare. Lamps in year from 1 Apr. for Royal West of England Convalescent Hospital.—See 18 Feb. issue.

1 Mar.—Barnsley T.C. Lamps in year from 18 Apr.—See 18 Feb. issue.

1 Mar.—Birkenhead T.C. Equipment for Technical Colleges.—See 28 Jan. issue.

1 Mar.—Leeds T.C. Lamps in year ending 31 Mar., 1955.—See 11 Feb. issue.

1 Mar.—N. Ireland. Installations in 88 dwellings at Keady and Randalstown.—See 18 Feb. issue.

1 Mar.—Poplar B.C. Lamps in year ending 31 Mar. 1955.—See 18 Feb. issue.

1 Mar.—Rowley Regis T.C. Electricians' requisites in year from 1 Apr.—See 18 Feb. issue.

2 Mar.—Aberdeen. Electrical work at Inverurie Academy.—See 18 Feb. issue.

2 Mar.—Farnborough (Hants) U.D.C. Sewage pumps with electric motors, starters, control panels, switchgear and standby plant at Cove works.—Advertised in 11 Feb. issue.

3 Mar.—N. Ireland. Installation in Min. of Commerce Advance Factory at Dungannon.—See 11 Feb. issue.

4 Mar.—Berkshire. Concrete columns with sodium discharge lamps, switchgear and fuses, for street lighting at Twyford cross-roads.—Advertised in 18 Feb. issue.

4 Mar.—Midlothian. Electrical work in 18 houses at Gorebridge. County Architect, 32 Palmerston Place, Edinburgh.

5 Mar.—Arnold (Notts) U.D.C. Tungsten, sodium and mercury lamps in year from 1 Apr.—See 18 Feb. issue.

5 Mar.—Belfast T.C. Seven 220,000 lb/hr stoker fired boiler units and other plant for power station West.—Advertised in 31 Dec. issue.

5 Mar.—Belfast T.C. Feed heating and condensing plant sets; and piping, steam receivers and associated valves, electrical controls, fittings, etc.—Advertised in 7 Jan. issue.

5 Mar.—Coleraine (Londonderry). Installation at Coleraine Hospital.—See 18 Feb. issue.

5 Mar.—Manchester T.C. Supply of street lighting lanterns and auxiliary equipment. City Surveyor, Town Hall.

5 Mar.—Co. Meath. Electrically driven pump for Nobber water supply scheme. —See 18 Feb. issue.

6 Mar.—Chippenham T.C. Electrical fittings.—See 18 Feb. issue.

6 Mar.—Kenilworth U.D.C. Supply of street lighting columns and electric lanterns in year from 1 Apr. Surveyor, Council House.

8 Mar.—Dublin. Wiring at Dr Steevens' Hospital.—See 4 Feb. issue.

8 Mar.—Hereford T.C. Sodium discharge and fluorescent lamps and columns along main roads.—Advertised in 18 Feb. issue.

8 Mar.—Huntingdonshire. Installation in Ramsey and St. Ives secondary schools.—See 18 Feb. issue.

8 Mar.—N. Ireland. Electrical engineering materials in year from 1 Apr. for Forster Green Hospital.—See 18 Feb. issue.

8 Mar.—Stockport. Hospital Management Committee requires supply of electric lamps. Supplies Officer, Administrative Offices, 59b Shaw Heath.

10 Mar.—Co. Down. Electrical installation in Lisnasharragh intermediate school, Castlereagh. F. W. Parkinson and Partners, consulting engineers, 6 Murray St, Belfast. Deposit £3. 3s.

10 Mar.—N. Ireland. Installation at Erne Clothing Co.'s factory at Enniskillen.—See 18 Feb. issue.

11 Mar.—Carlow (Eire). Duplicate electrically driven pumping plant at Orchard Bridge.—See 18 Feb. issue.

12 Mar.—Ashton-in-Makerfield U.D.C. Electrical installation in 74 houses on Bolton Rd estate. Surveyor, Town Hall.

12 Mar.—Southend-on-Sea T.C. P.i.l.c. underground main and street lighting fittings at Connaught Hse.—Advertised in 18 Feb. issue.

13 Mar.—Airdrie T.C. Lamps during year from 16 May.—See 11 Feb. issue.

13 Mar.—Dublin. Horizontal centrifugal high lift and low lift pumps.—See 11 Feb. issue.

13 Mar.—Dundalk. Partial rewiring and supply of electric storage heating at St. Mary's Hospital, Drogheda. C. O'Cleireachain, county offices, Dundalk. Deposit £3. 3s.

15 Mar.—East Riding. Installation at Brough secondary school.—See 18 Feb. issue.

15 Mar.—N. Ireland. Electrical installation at Rainey endowed school, Magherafelt. F. W. Parkinson and Partners, 6 Murray St, Belfast. Deposit £3. 3s.

15 Mar.—Skegness U.D.C. Supply and installation of (a) diesel-engine-driven generating sets (contract S.2); and (b) electrically-driven sewerage pumping machinery (contract S.3); at Richmond Drive pumping station. Consulting Engineers, W. H. Radford and Sons, Albion Chambers, King St, Nottingham.

18 Mar.—Westmeath (Eire). Electrical installation in county clinic at Mullingar. J. V. Tierney and Co., consulting engineers, 15-16 Duke St, Dublin. Deposit £6. 6s.

20 Mar.—Golborne U.D.C. Supply and installation of electrically driven water booster plant at Houghton Coat. J. B. Hoyle, Engineer and Surveyor, Council Offices, Lowton, nr Warrington.

21 Apr.—Fifeshire. Electrical installation in High School at Kirkcaldy. James Gentles and Son, chartered quantity surveyors, Central Chambers, Kirkcaldy.

Your Queries Answered

Readers are invited to make use of our free enquiry department which possesses wide resources including an index of trade information with over 100,000 entries

A Selection from the 98 queries answered this week

"Pierite" insulation, makers of? H.L.—G. R. Speaker and Co., Ltd., Eternit Hse, Stevenage Rd, S.W.6.

"Interlite" signs, makers of? J.L.E.S.—K.F.M. Eng. Co., Ltd., K.F.M. Works, Waterloo Rd, N.W.2.

"Taycon Super Dryer" commercial hair dryer, suppliers of? W.P.—Maison Taylor (Manchester) Ltd., 131 Oxford Rd, All Saints', Manchester 1.

Adjustable plastic cable bunching straps, makers of? T.B.C.—Hellerman Electric Ltd., Tinsley Lane, Crawley, Sussex.

New Departure Ball Bearings, address for? C.E.W.—111 Grosvenor Rd, S.W.1.

Meadows Corpn. washing machines, address for service? J.B.K.—Thor Appliances Ltd., 156 Dukes Rd, W.3.

"Pearlco" oven lamps, suppliers of? B.E.W.—Pearl Electrical Co., Pearl Hse, Crown St, W.3.

Multiplex double filament lamps, suppliers of? C.I.—B.E.C. (British Electric Corpn.) Ltd., 216 Columbia Rd, E.2.

22 Mar.—Manchester T.C. Electrical installation in 14 shops and 18 flats (contracts 183 and 184); in 108 houses, flats and maisonnettes (201); in 108 houses (202); and in 210 houses (209); all on Langley estate, Middleton. Director of Housing, Town Hall. Deposit £1. 1s.—Advertised in this issue.

22 Mar.—The Dearne U.D.C. Supply and erection of 57 mercury vapour and 4 fluorescent lighting units on concrete columns in group A scheme along Claydon Lane and George St, Thurnscoe (B6411). F. Baxter, Engineer and Surveyor, Council Offices, Bolton-upon-Dearne. Deposit £2.

22 Mar.—Yeovil T.C. Supply of 48 steel columns, and supply and erection of 36 250 W mercury, seven 80 W mercury vapour fluorescent, and five 100 W tungsten lamps, for street lighting. A. Heal, Surveyor, Municipal Offices, King George St.—Advertised in this issue.

24 Mar.—Ilford T.C. Pumps, motors and other equipment for sewage at pumping station.—Advertised in 4 Feb. issue.

24 Mar.—Littlehampton U.D.C. Electrical installation in 30 houses on Wickbourne estate. Engineer and Surveyor, Council Offices. Deposit £1. 1s.

26 Mar.—Belfast T.C. Two sets of central evaporating plant for power station West.—Advertised in 28 Jan. issue.

26 Mar.—Belfast T.C. Supply, erection at West power station of automatic water jet fire fighting and alarm installation. (Tender form N.1486). Merz and McLellan, consulting engineers, Carliol Hse, Newcastle-on-Tyne. Deposit £5. 5s.—Advertised in this issue.

No date stated—Barrhead T.C. Electrical installation in 2- and 3-storey blocks comprising 20 flats in Graham St. Names to W. Baillie and Son, architects, 4 West Regent St, Glasgow.

No date stated—S. Devon. Rewiring of Moorhaven Hospital at Ivybridge. Consultants, Hoare, Lea and Partners, 5 Headland Park, Plymouth. Deposit £2. 2s.

No date stated—N. of Scotland H.E. Board. 33 kV o.h. lines; reconstruction of 11 kV distribution lines.—Advertised in 18 Feb. issue.

No date stated.—N. of Scotland H.E. Board. Construction of 132 kV-transmission line between Beauly and Nairn. Merz and McLellan, 72a George St, Edinburgh. Deposit £2. 2s.—Advertised in this issue.

. . . and Overseas

*Details of items marked * may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.*

12 Mar.—South Africa. Manufacture and supply of two outdoor type circuit-breakers 750 MVA, 33 kV, and six 33 kV 3-phase outdoor air break switches not less than 300 amp current carrying capacity. (Contract E. 2477.) Durban Electricity Dept., Alice St, Durban. B.o.T. (Ref.: ESB 2571/54).*

15 Mar.—Canada. Supply and installation at Brandon, Manitoba, power station of two 30,000 kW steam turbo-generator sets, and possibly a third later. Each should have rating of 35,294 kVA at 0·5 psig hydrogen pressure, 0·85 power factor, 13,800 V, 3-phase, 60 c/s. Manitoba Hydro-Electric Board, Electric Railway Chambers (10th floor), Winnipeg. B.o.T. (Ref.: CRE 1031/54).*

PRICES of cable metals and other materials

Figures quoted are the official prices ruling on Tuesday, 23 February

	£ per ton	Weekly change £	Price last year £
COPPER, standard class A (settlement)	236	+1	285
,, (3 months)	218¾	+2¼	—
LEAD, refined pig, min. 99·97% purity (cash) ...	82½	+¼	93⅜
,, (3 months)	81½	—	92½
TIN, refined, min. 99·75% purity (settlement) ...	669	+41½	957½
,, (3 months)	641	−4	937½
ALUMINIUM, ingots 99-99·5%	156	—	166
ZINC, virgin, min. 98% purity (cash)	72½	+½	81
,, (3 months)...	70⅝	+½	81⅜
RUBBER No. 1, RSS. spot (per lb)	16½d.	−⅛d.	23½d.
,, c.i.f. basis, ports. Apr. (per lb)	16⅝d.	−⅛d.	22⅛d.
ARMOURING:			
Galv. Steel Wire (0·104 in.)	51½	—	52
Mild Steel Tape (0·014 in.)	40	—	39½

31 Mar.—India. Supply of various substation equipment for Damodar Valley Corporation's Electricity Dept. Chief Electrical Engineer of Corporation, Anderson Hse, Alipore.

10 Apr.—Luxembourg. Turbines and other equipment for Esch-sur-Sure hydro-electric scheme. Ministere de Transports et de l'Electricite, Luxembourg. B.o.T. (Ref.: ESB 1782/53).*

19 Apr.—India. Six-panel 3·3 kV switchboard for power station at Bhavnagar. Specifs (E-26) from B. P. Mehta, manager, Godhra Electricity Co., Ltd., Bhavnagar.

19 Apr.—India. Three feeder control panels, two power house auxiliaries transformer control panels, and one interconnecting panel, for Godhra Electricity Co., Bhavnagar. B.o.T. Ref. ESB/3463/54.

21 Apr.—Australia. One outdoor arc-suppression coil, 38,100 V., 50-100 A., for State Electricity Commission of Queensland. B.o.T. Ref. ESB/2692/54.*

22 Apr.—Egypt. Supply and erection of h.v. transmission lines and switch stations for feeding transformer stations for second extension of N. Delta Elect. scheme. Min. of Public Works, Cairo. B.o.T. (Ref.: ESB 3534/54).*

28 Apr.—Australia. Two 7,500 kVA, 62/11 kV step down transformers for State Electricity Commission of Queensland. B.o.T. Ref. ESB/3106/54.

11 June.—Australia. Arc suppression coils for 66 kV system for Capricornia Regional Electricity Board. Specification can be inspected at 409/410 Strand, London, W.C.2.

11 June—New Zealand. Waitemata Electric Power Board invite tenders for supply of three 10 MVA and five 7·5 MVA double-wound transformers. Board is at 81 Albert St, Auckland. B.o.T. (Ref.: ESB 1862/54).*

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Autocap. 725,328. Class 9. Electric accumulators. Magnatex Ltd., Harlington Works, Bath Rd, Harlington, Middx.

Embassy. 725,120. Class 9. Electronic apparatus and instruments, etc. Oriole Records Ltd., 119 Bishopsgate, E.C.2.

Lochrin. B 721,068. Class 9. Insulated electric wire, fuse wire and cables. Wm. Bain and Co., Ltd., Lochrin Ironworks, Coatbank St, Coatbridge, Lanarks.

Marconi. 702,309. Class 9. Wireless, telephonic and telegraphic apparatus etc. Marconi's Wireless Telegraph Co., Ltd., Marconi House, Strand, W.C.2.

Orthotron. 723,883. Class 9. Scientific and electrical apparatus. Metropolitan-Vickers Electrical Co., Ltd., 1/3 St. Paul's Churchyard, E.C.4.

Platinohmic. 718,400. Class 9. Resistors. Painton and Co., Ltd., Bembridge Drive, Kingsthorpe, Northampton.

Sessionaire. 725,039. Class 9. Sound amplifiers. Henri Selmer and Co., Ltd., 114/116 Charing Cross Rd, W.C.2.

Sparconomic. 723,223. Class 7. Electric alternators, generators, erosion machines etc. 723,224. Class 9. Scientific and electrical apparatus. Sparcatron Ltd., Abbey Yard, Bath.

Talbe. B722,356. Class 9. Radio apparatus, etc. Burndept Ltd., 681 Salisbury Hse, Finsbury Cir., E.C.2.

Tellaloud. B719,970. Class 9. Loud-speaking telephonic apparatus, etc. Winston Electronics Ltd., 1 Park Rd, Hampton Hill, Mddx.

Contracts Placed

Bedfordshire. Electrical installation at Sandy secondary school, Bedfordshire Electrical Installation Co., Ltd., £1,698.

Bridgwater (Som.) T.C. Electrification of pumping plant at Ashford waterworks, S.W. Electricity Board, £1,148.

Dewsbury T.C. Electrical work at Ravensthorpe infants' school, Smith and Wood, £1,563; same in 122 dwellings on Wakefield Rd site, and in 148 dwellings on Church Lane site, Senior and White Ltd., £2,462 and £2,909.

Glendale (Northumb) R.D.C. Electrical installation in £7,000 council offices at Wooler, J. Tully and Co.

Hendon T.C. Improved street lighting along Watford Way, Revo Electric Co., Ltd., £2,218.

London. Supply and maintenance of lifts on five estates, J. and E. Hall Ltd., £56,750.

Rowley Regis T.C. Installation of 39 80 W mercury lamps on concrete columns on Tividale Hall estate, Metropolitan-Vickers Electrical Co., Ltd., £1,545.

Southall T.C. Supply and erection of 33 columns and 60 W sodium lanterns along Havelock Rd, Erecon Ltd., £1,219.

BUSINESS PROSPECTS

Alloa. Revised plans approved for erection of senior secondary school.

Ayr T.C. Dean of Guild Court approved erection of 250 houses on Forehill site. Estimated cost of about £387,300.

Bangor (N.I.) General Hospital is to be enlarged at cost of about £80,000.

Bideford (Dev.) T.C. It is proposed to build infants' school in Coronation Rd.

Bishop Auckland U.D.C. Construction of 106 houses on Woodhouse Close estate. J. Ford. surveyor, 50 North Bondgate.

Brigg R.D.C. Forty houses and 10 bungalows at Winteringham to cost of about £64,870.

Bristol. Architects for premises at Kingswood for Bennett Bros. Ltd., printers and manufacturers, are A. F. French and Partners, Halifax Hse, St. Augustine's Parade, Bristol.

Camberwell B.C. Erection of six blocks of flats and maisonettes comprising 130 dwellings on site 50 in Pelican Yard. Town Clerk, Town Hall, Peckham Rd, S.E.5.

Cardiff T.C. Erection of total of 193 dwellings at Llanrumney under five contracts. City Surveyor, City Hall.

Carrickfergus (Antrim). Approval sought for erection of hospital building. Cost estimated at £30,000.

Cheltenham. Plans in hand for development and research laboratory in Gloucester Rd for Dowty Equipment Ltd.

Conisborough. Hospital improvements, including electrical and other services, costing about £18,000 proposed by Sheffield Hospital Board.

Consett U.D.C. Further 83 houses to be built on Moorside estate.

Doncaster. Construction of new £104,000 Art Gallery and Museum is to start in 1955-56.

Doncaster R.D.C. Thirty houses to be built at Armthorpe, 26 at Edlington, and 24 at Askern.

Dorchester R.D.C. Forty houses to be built at Charminster, 16 each at Frampton and Chickerell, 10 at Puddletown and 8 each at Alton Pancras and Osmington.

Eastbourne. Borough Surveyor has prepared sketch plans for erection of factory on Brampton Rd estate, for Smith and Ouzman Ltd., 123 Whitecross St, E.C.1.

East Ham T.C. It is proposed to build total of 196 dwellings on Aldersbrook site.

Eccles T.C. Municipal offices proposed in King St.

Felixstowe U.D.C. Construction of 20 bungalows in Mill Lane. R. W. Harvey, clerk of council, Town Hall.

Felling-on-Tyne. International Paints Ltd. to build office block in Stoneygate Lane.

Folkestone T.C. Total of 65 houses to be built on eight sites.

Gateshead T.C. R. W. Gregory and Partners, Pilgrim Hse, Newcastle, appointed electrical consultants for Learn Lane primary school.

Gravesend T.C. Approval granted for erection of 48 flats in St. Gregory's Cres.

Greenock. Dean of Guild Court has approved erection of R.C. primary school in Westmorland Rd in Larkfield area.

Guildford (Sur.) R.D.C. Application for erection of R.C. church on Dorking Rd at Gomshall, has been approved.

Hamilton. Dean of Guild Court has approved erection of home for old people at Balgreen at estimated cost of £29,000.

Haydock (Lancs) U.D.C. Construction of 38 houses on Church Rd site. R. Main, Surveyor, Council offices.

Heanor (Derby) U.D.C. Erection of 40 houses on Loscoe estate. R. Archer, Engineer and Surveyor, Council Offices.

Holywell (Flint) U.D.C. Erection of 28 houses on Meadowville estate. Engineer and Surveyor, F. E. G. Grey, Town Hall.

Houghton-le-Spring U.D.C. Loan sanction for £204,030 received for erection of 50 houses on Barnwell estate and 106 on Racecourse site. Also Manchlen and Weightman, Saville Row, Newcastle, are architects for factory addition for Charles and Co. (Dresses) Ltd.

Huyton-with-Roby U.D.C. Erection of 72 houses on St. John's Rd (East) site. Chief Architectural Asst., Council Offices, Derby Rd.

Ipswich T.C. Erection of 20 houses and 20 bungalows on Maidenhall estate. Borough Engineer and Surveyor, 19 Tower St.

Kilmarnock. Plans approved by Dean of Guild Court for erection of houses on Outhank estate. Estimated cost of scheme £233,000.

Lewisham. It is proposed to build new receiving ward block at Ladywell Lodge to cost about £10,305.

Llanelly. M. Davies and Co. propose to erect factory at Machynis.

Middlesbrough. Education Committee approved plans for electrical work at schools. Rewiring at Archibald Senior Boys and Juniors school £1,050; New service cable at Archibald School £700; Rewiring £1,200 and new service cable £500 at Ayresome Senior Girl's and Infant's school.

Mitcham (Sur.). G. A. Cramp and Sons Ltd. propose to erect factory off Willow Lane. Architect is G. Watt, 146 Mostyn Rd, London, S.W.20.

Morpeth T.C. Approval sought for erection of 78 houses in Spelvit Lane.

Newcastle-under-Lyme. Land in Loomer Rd being offered to Neckwear Ltd., of London, E.C.2, and Macclesfield, for industrial development.

Northumberland. £82,500 to be spent on new fire brigade H.Q. at Morpeth, including station and 29 houses.

Nottingham T.C. Erection of 4 shops on Fernwood estate and 12 houses on Bilborough estate. City Housing Architect, The Guildhall.

Oxford. Plans approved for 50,000 sq ft research and development building for Morris Motors Ltd.

St. Neots U.D.C. It is proposed to build 44 houses at Eynesbury.

Scunthorpe. Approval sought for £200,000 scheme for modernisation and extension at War Memorial Hospital for Sheffield Hospital Board.

Scunthorpe. Hornsby and Goodwyn Ltd., propose new industrial buildings in North St and Winterton Rd. Council's approval sought.

South Shields T.C. Electricity to be installed in another 247 houses on Cleadon Park estate at estimated cost of £3,404.

Stockton-on-Tees T.C. £480 to be spent on provision of improved lighting at Bowesfield Lane Girls' School.

Stockton-on-Tees. New Church of England Tintern Avenue, Architect G. E. Charlewood, 14 Neville St, Newcastle. Also new warehouse and office at North End for Goodyear Tyre & Rubber Co., Ltd.

Swindon T.C. Tenders may soon be invited for erection of 156 dwellings and 10 shops in Penhill neighbourhood.

Torquay. Plans submitted by Singleton Bros. (Instruments) Ltd., of Ilfracombe for factory in Coombe Lane.

Walthamstow. Plans being prepared for N. Walthamstow Technical School in Billet Rd. Estimated cost £120,000.

Warrington T.C. Approval sought for rewiring of Central Police Buildings at estimated cost of £1,500.

Windsor R.D.C. Tenders to be invited for erection of 36 dwellings on Newton Court estate.

Overseas

Afghanistan. British Embassy at Kabul asked to obtain quotations for small washing machines operating on 220 V a.c. Manufacturers should communicate with Second Secretary (Commercial) at the Embassy.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, W.C.2.

Dalston Motors Ltd., 85 Balls Pond Rd, N.1. Motor, mechanical and electrical engineers, etc. Nom. cap.: £1,000. Dirs.: P. Packman and Doris Packman.

Duncan, Partners and Price Ltd., Bond St Hse, 14 Clifford St, W.1. Manufacturers of and dealers in lamps, lights, shades and other lighting equipment, etc. Nom. cap.: £3,000. Dirs.: to be appointed by subs. Subs.: D. Duncan, 15F Hyde Park Mansions, N.W.1; M. W. Bedward, 112A Kew Rd, Richmond; M. Aza-Selinger, 20 Lyndale Av, N.W.2.

Woodward Bros. (Kidlington) Ltd., 21 Exeter Rd, Kidlington, Oxford. Electricians, radio and electrical engineers, etc. Nom. cap.: £5,000. Dirs.: H. C. Woodward and B. L. Woodward.

L. E. Lavender and Co., Ltd., 6 Frant Rd, Tunbridge Wells. Manufacturers of and dealers in agricultural, building, chemical, engineering, electrical and veterinary equipment, supplies and products; manufacturers of and dealers in refrigerators and machinery for cold storage, etc. Nom. cap.: £2,000. Dirs.: L. E. Lavender and Mary Lavender.

Shaver Services Ltd., Bengal St, Redhill St, Ancoats, Manchester 4. Designers and manufacturers of and dealers in electrical shavers and electrical and electronic apparatus and supplies, etc. Nom. cap.: £100. Dirs.: to be appointed by subs. Subs.: H. Longworth, 7 Almond Ave, Bury, Lancs; and D. B. Hough, 5 Lower Park Rd, Victoria Park, Manchester 14.

Vigus and Company Ltd. To take over business of retail radio and electrical dealers and repairers carried on as "Gem Radio and Electrical Services" at 413 Sydenham Rd, West Croydon; 167 Mitcham Rd, Tooting; 43 Anerley Rd, Croydon; 40 Grove Vale, Dulwich; and 113 Bellenden Rd, Peckham. Nom. cap.: £10,000. Dirs.: A. Vigus, 73 Dagnall Park, S.E.25; R. F. Codling, 51 Links View Rd, Shirley, Croydon; A. W. E. Vigus and S. H. Vigus.

MEETINGS TO NOTE

THURSDAY, 25 FEB.

TELEVISION Soc.—Fleming Memorial lecture on "Colour TV," G. G. Gouriet. Royal Instn., Albemarle St, W.1, 7 p.m.

INST. OF WELDING (S. London).—"Influence of Arc Welding on Modern Engineering Design," K. K. Doherty. Wandsworth Tech. College, S.W.18, 7 p.m.

I.E.E.—Annual dinner at Grosvenor Hse, Park Lane, W.1, 7 p.m.

I.E.E. (E. Midland).—"Overhead Lines," Swan St Hall, Spalding, 7.30 p.m.

I.E.E. (N. Midland).—"Ignition Interference with TV Reception," A. H. Ball and W. Nethercot. Elect. Offices, Ferensway, Hull, 7.15 p.m.

A.S.E.E. (Luton).—"Modern Applications of Fluorescent and Tungsten Lighting," D. E. Mutch. George Hotel, George St, 8 p.m.

FRIDAY, 26 FEB.

I.E.S. (Bath and Bristol).—"Black Light—Effect and Applications," R. V. Mills. Elect. Offices, Old Bridge St, Bath, 7 p.m.

I.E.S. (Birmingham).—Annual meeting. "Illuminations from Ophthalmic Standpoint," W. J. Wellwood Ferguson. Regent Hse, St. Phillip's Place, Colmore Row, 6 p.m.

N.E. ELECTRIC CLUB.—Ladies' Night.

MONDAY, 1 MAR.

I.E.E. (N.E. Radio and Measurements).—"Applications of Electrolytic Tank to Engineering Design Problems," H. Diggle and E. R. Hartill, King's College, Newcastle, 6.15 p.m.

I.E.E. (Mersey and N. Wales).—"Design Features of Semi-Outdoor Power Station at Ince," F. H. S. Brown. Liverpool Royal Instn., Colquitt St, 6.30 p.m.

I.E.E. (S. Midland).—"Research in Electrical Manufacturing Industry," L. J. Davies. James Watt Memorial Inst., Gt. Charles St, Birmingham, 6 p.m.

I.E.E. (Western Supply).—"Safety Precautions in Electricity Supply from viewpoints of Supply Authority, Manufacturer and H.M. Inspector of Factories," B. L. Williams R. N. Buttrey and E. Sutton. S. Wales Inst. of Engrs., Park Place, Cardiff, 6 p.m.

I.E.E. (Ipswich).—"Grain Drying by Electricity," W. Cover. Crown and Anchor Hotel, 6.30 p.m.

I.E.E. (Maidstone).—"Electric Lifts in Post-war Housing," C. G. L. Morley. "Wig and Gown," 7.30 p.m.

A.S.E.E. (Leeds).—"Control Gear," R. F. Mathieson. Gt. Northern Hotel, 7.30 p.m.

A.S.E.E. (Sheffield).—"Association Affairs," E. A. Bromfield. Royal Victoria Station Hotel, 7.30 p.m.

E.P.E.A. (London).—"Hydrogen Cooled Alternators," H. M. Oliver. Caxton Hall, Westminster, 7 p.m.

I.E.E. (London Students).—"Industrial Consumer Installation Practice," J. J. Peacock. Savoy Place, W.C.2, 6.30 p.m.

TUESDAY, 2 MAR.

I.E.E. (London Measurements).—"Current and Power Relationships in the Measurement of Iron Losses in a Three-Limbed Transformer Core," Prof F. Brailsford; "Automatic Plotter for Magnetic Hysteresis Loops," H. McG. Ross. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Western).—"Fundamental Electromagnetic Theory," P. Hammond. Engrs.' Club, Albert Sq, Manchester, 6.15 p.m.

A.S.E.E. (S.E. London).—"Manufacturing." Congregational Church Hall, Court Rd, Eltham, 8 p.m.

A.S.E.E. (W. London).—"Industrial Electronics," T. S. Worthington. Windsor Castle Hotel, 134 King St, Hammersmith, 7.30 p.m.

A.S.E.E. (Portsmouth).—Lecture at B.E.A. Offices, High St, Old Portsmouth, 7.30 p.m.

WEDNESDAY, 3 MAR.

I.E.E. (Tees-side).—"New Approach to Theory and Operation of Electrostatic Precipitators for Use on Pulverised-Fuel-Fired Boilers," N. Troost. Cleveland Scientific and Technical Inst., Middlesbrough, 6.30 p.m.

I.E.E. (N. Midland and Sheffield).—"Researches on Circuit-Breaking by High-Voltage Circuit-Breakers, especially Current-Chopping," A. F. B. Young. Town Hall, Barnsley, 7 p.m.

I.E.E. (S.W. Scotland).—"Continuity of Electricity Supply," H. Leyburn. 39 Elmbank Cres, Glasgow, 7 p.m.

I.E.E. (Rugby).—"Transformer-Analogue Network Analysers," M. W. Humphrey Davies and G. R. Slemon. College of Technology and Arts, 6.30 p.m.

I.E.E. (Southern).—"Technical Arrangements for Sound and TV Broadcasts of Coronation," W. S. Procter, M. J. L. Pulling and F. Williams. Elect. Offices, Hove, 6.30 p.m.

I.E.S. (Edinburgh).—"Church Lighting," L. C. Retting Manor Club, 12 Rothesay Place, 7 p.m.

I.E.S. (Newcastle).—"Dark Adaptation and Miners' Nystagmus," W. J. Wellwood Ferguson. Connaught Hall Y.M.C.A., Blackett St, 6.15 p.m.

I.E.S. (Swansea).—Three papers and discussion. Minor Hall, Y.M.C.A., 6.30 p.m.

INSTN. OF ELECTRONICS.—"Applications of Radio Isotopes," E. W. Jones. Royal Soc. of Arts, W.C.2, 7 p.m.

I.E.E. (London Students).—"Metallic Resistance at High Frequency," A. D. Stevens. Public Library, Chelmsford, 7 p.m.

N.E. ELECTRIC CLUB.—"Electric Traction," J. Milne.

THURSDAY, 4 MAR.

I.E.E. (London).—"Submerged Telephone Repeaters for Shallow Water," R. J. Halsey and F. C. Wright; "Netherlands-Denmark Submerged-Repeater System," A. H. Roche and F. O. Roe; "British P.O. Standard Submerged-Repeater System for Shallow-water Cables, especially England-Netherlands System," D. C. Walker and J. F. P. Thomas. Savoy Place, W.C.2, 5.30 p.m.

I.E.E.—Scottish Centre annual dinner at George Hotel, Edinburgh, 7 p.m.

I.E.S. (Cardiff).—"Glass in Lighting Industry," J. G. Holmes. Elect. Offices, The Hayes, 5.45 p.m.

I.E.S. (Glasgow).—"Aerodrome Lighting," A. V. Campbell. 39 Elmbank Cres, 6.30 p.m.

I.E.S. (Gloucester and Cheltenham).—"Department Store Lighting," A. W. Jervis. Cadena Cafe, High St, Cheltenham, 6.30 p.m.

I.E.S. (Nottingham).—Brains Trust. Elect. Offices, Smithy Row, 6 p.m.

A.S.E.E. (S. London).—Lecturettes at Cafe Royal, Croydon, 8 p.m.

INCORP. PLANT ENGINEERS (Peterboro').—"Welding for Maintenance," J. S. Skelton. Gas Showrooms, 7.30 p.m.

FRIDAY, 5 MAR.

I.E.E. (E. Midland).—Annual dinner at Victoria Station Hotel, Nottingham, 6.45 p.m.

I.E.E. (Southern).—"Demonstrations of Synthetic Speech," W. Lawrence and R. A. Eades. Technical College, Weymouth, 6.30 p.m.

A.S.E.E. (Liverpool).—Lecture at Engineering Soc., 9 The Temple, Dale St, 7.30 p.m.

BIRMINGHAM ELECTRIC CLUB.—Annual dinner.

Gazette Announcements

COMPANIES ACTS

H. J. Cornall and Co., Ltd. Last day for receiving proofs in respect of intended dividends is 9 Mar. Liquidator is F. C. Ormrod, of 20 Byrom St, Manchester 3.

Ascwa Heating Ltd. Meetings of creditors and contributories will take place on Tues. next (2 Mar.) at Inveresk Hse., Strand, W.C.2, at 2.30 p.m. and 3 p.m.

Electric Tool Development Co., Ltd. Resolution for voluntary winding-up passed at meeting on 10 Feb. D. A. Lumley of 2 Burwood Rd, Hersham, Surrey, has been appointed liquidator.

Electronic Services (Westerham) Ltd. Meeting of members and creditors will be held at 3 Broad St Bldgs., Liverpool St, E.C.2, on 15 Mar. at 3 p.m. and 3.15 p.m. resp. to receive liquidator's report.

Voluntary Liquidation

Snow, Deakin and Co., Ltd. At statutory meeting of creditors statement of affairs submitted showing liabilities £7,761, all due to unsecured creditors, against net assets of £4,447, leaving deficiency as regards creditors of £3,313. Fully paid share capital was £6,700 and, so far as shareholders were concerned, there was total deficiency of £10,013. Principal asset was freehold property at Torrington Lane, Bideford, valued at £5,000. Note explained that as regards the factory the value was a previous contract price for sale. Present value was unknown. Creditors passed resolution for appointment of Mr E. A. Savage, of J. and A. W. Sulley and Co., C.A., Abbey Gate Hse, College Green, Bristol, and Mr Philip W. Hort, of E. T. Collins and Son, C.A., 28 Baldwin St, Bristol, as joint liquidators. Committee of inspection also appointed.

Winding-up

Rodway Jones and Co., Ltd. At first meeting of creditors Official Receiver reported that winding-up order made on 18 Jan. Company formed in 1952, to acquire partnership business. Nominal capital was £3,000 of which £2 had been issued. It was stated that affairs would require investigation as it appeared partnership was in financial difficulties when taken over. The company had manufactured an electrical water heater. Official Receiver's opinion was that failure appeared to be due to mismanagement. It seemed an appliance had been made which needed considerable improvement. No statement of affairs had been filed but according to the Official Receiver's information, liabilities were about £600. Assets had been valued at £100. No resolution passed and matter was left in hands ofr Official Receiver as liquidator.

BANKRUPTCY ACTS

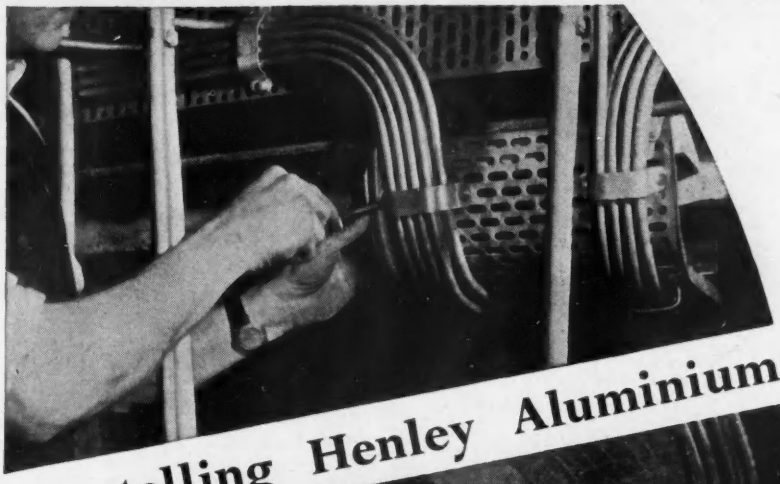
Release of Trustees

Boston. Frederick D. Ingall, radio electrician trading as Ruskington Radio-electrics at High St, Ruskington, Sleaford. Trustee was E. C. Stimpson, Official Receiver, 27 Park St, Park Row, Nottingham.

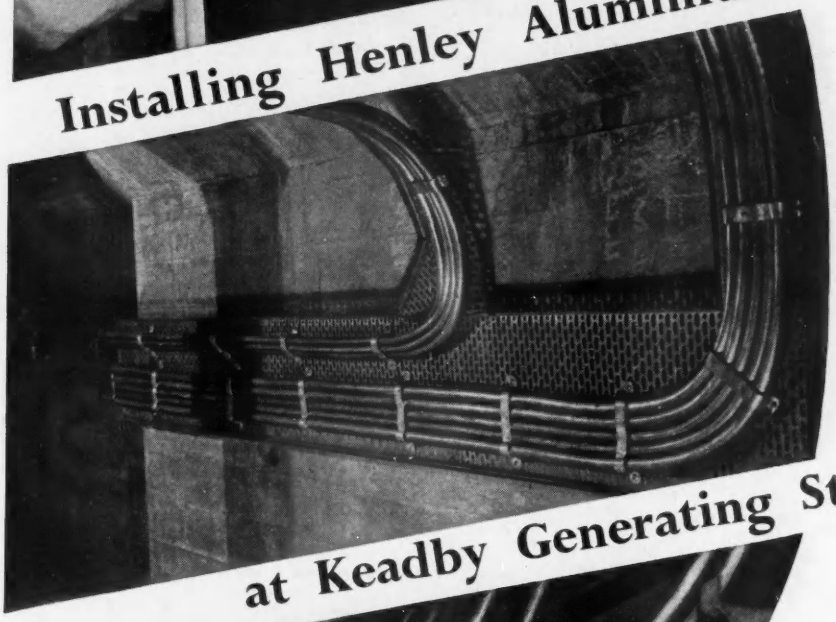
York. George H. Battye, electrician, trading as G. H. Battye at Clifton Rd, Pudsey. Trustee was W. H. Meredith, Official Receiver, 29 East Parade, Leeds

Intended Dividends

Middlesbrough. John G. Milne, electrical and radio dealer trading at 34 Whitworth Rd, Grangetown. Last day for receiving proofs, 12 Mar. Trustee is C. L. Hamer, 135a Albert Rd, Middlesbrough.



Installing Henley Aluminium Cables at Keadby Generating Station



Keadby Generating Station, with an ultimate capacity of 360,000 kilowatts (6 x 60 MW sets), is the first power station in Britain to have the bulk of its cabling carried out with aluminium sheathed cables of the seamless tube type.

HENLEY'S CONTRACT DEPARTMENT have been responsible for the entire cabling installation for the main station, and the outdoor switching site. The aluminium sheathed cables for sets 1, 2 and 3 were manufactured by Johnson & Phillips Ltd., Charlton, and those for sets 4, 5 and 6 by HENLEY'S.

(Manufactured in accordance with Patent No. 627815 or 627793.)

U.K. Consultants:
Messrs Ewbank & Partners Ltd

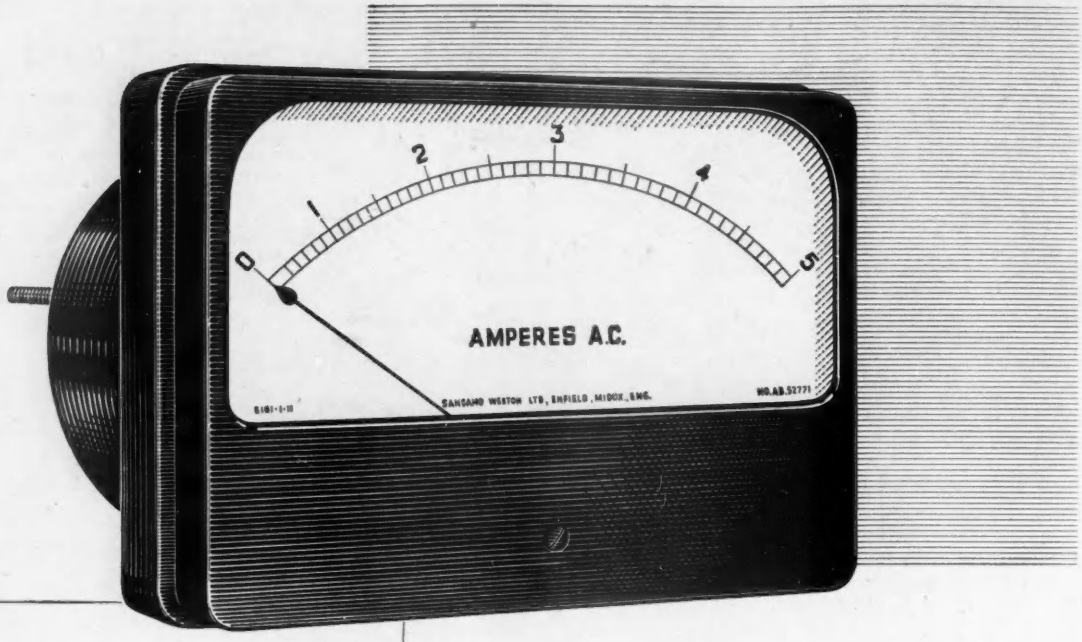
Whatever your requirements in Aluminium Cables, HENLEY'S will be pleased to supply, and assist with their specialised knowledge in any problem concerning installation.

BY APPOINTMENT
ELECTRIC CABLE
MANUFACTURERS

HENLEY

ALUMINIUM SHEATHED CABLES

W. T. HENLEY'S TELEGRAPH WORKS COMPANY LIMITED, 51-53 HATTON GARDEN, LONDON, E.C.1



WESTON ELECTRICAL INSTRUMENTS INCLUDE:–

LABORATORY STANDARDS

SUB STANDARDS

FIRST GRADE PORTABLE INSTRUMENTS

ROUND, RECTANGULAR AND EDGEWISE SWITCHBOARD AND PANEL INSTRUMENTS

PORTABLE TEST SETS

RELAYS

AIRCRAFT INSTRUMENTS

THE WESTON RANGE OF RECTANGULAR INSTRUMENTS

These instruments, giving the advantage of long, easily read scales, are designed to harmonize with rectangular panels and are offered in a variety of types and scale ranges.

Supplied as D.C. moving coil, A.C. rectifier and H.F. thermocouple types; also A.C./D.C. moving iron types.

Four sizes are available with scale lengths of 2·5″, 3·2″, 4·2″ and 6·25″.

Front of panel or back of panel mounting may be adopted as desired and if the former method is used, there is complete interchangeability with existing round models.

The 3·2″ and 4·2″ scale instruments are available with either illuminated or non-illuminated dials; the 2·5″ and 6·25″ scale instruments being available only with non-illuminated dials.

WESTON

Measuring Instruments

SANGAMO WESTON LIMITED

ENFIELD · MIDDLESEX

Tel: Enfield 3434 (6 lines) & 1242 (6 lines) Grams: Sanwest, Enfield

Scottish Factory: Port Glasgow, Renfrewshire. Port Glasgow 41151

Branches: London, CHAncery 4971 · Glasgow, Central 6208 · Manchester, Central 7904 · Newcastle-on-Tyne, Newcastle 26867 · Leeds, Leeds 30867 · Liverpool, Central 0230 · Wolverhampton, Wolverhampton 21912 Nottingham, Nottingham 42403 · Bristol, Bristol 21781 · Southampton, Soton 3328 · Brighton, Brighton 28497

CLASSIFIED ADVERTISEMENTS

Advertisements should be sent to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London, W.C.2, before 10 a.m. on TUESDAY of the week of issue. Official Displayed Advertisements are charged at 32s. 6d. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted four insertions at twice the single insertion rate. Fee for Box Number and postage on replies 2s.

TENDERS INVITED

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD
132 kV Transmission Lines

TENDERS are invited for the construction of 132 kV transmission lines between Beauly and Nairn in the Counties of Inverness and Nairn.

Copies of the Tender Document may be obtained on application to the Engineers, Messrs Merz and McLellan, 72a George St, Edinburgh 2.

Applications should be accompanied by a cheque for £2. 2s. (returnable).

The Board do not bind themselves to accept the lowest or any Tender.

16 Rothesay Ter, Edinburgh 3 — W. D. D. FENTON, Secretary.

(G 697)

CITY OF MANCHESTER

THE Housing Committee invite tenders for the Electrical Installation work on the following contracts at Langley Estate, Middleton, near Manchester:

Contracts 183 and 184—14 Shops and 18 Flats.

Contract 201—108 Flats, Maisonettes, and Houses.

Contract 202—108 "No-Fines" Houses.

Contract 209—210 Houses.

Specifications, schedules and tender documents may be obtained on payment of a deposit of £1. 1s. (cheques made payable to the Corporation of Manchester and returnable on receipt of a bona fide tender and the return of the documents) from the Director of Housing, Town Hall, Manchester 2. Tenders, which must be sealed in an official envelope endorsed "Electrical Installations—Langley Estate" and addressed to the Chairman of the Housing Committee, must be received at the office of the Director of Housing not later than Monday, 22 Mar., 1954.

PHILIP B. DINGLE, Town Clerk.

(G 740)

CITY OF BELFAST
Electricity Department

Automatic Fire Fighting and Alarm Installation

TENDERS are invited for the supply, delivery and erection at Belfast Municipal Electric Power Station West of automatic water jet fire fighting and alarm installation.

Form of Tender (N.1486), conditions, specification and drawings, in quintuplicate, may be obtained from Messrs Merz and McLellan, Consulting Engineers, Carliol Hse, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas which will be refunded provided a bona fide Tender is lodged and not withdrawn. Extra copies of the contract documents may be obtained at one guinea each; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Each Tender, in quadruplicate, in sealed envelope marked "Tender for Automatic

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Fire Fighting and Alarm Installation, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on FRIDAY, 26 MAR., 1954.

An official receipt must be obtained for each Tender delivered by hand. Tenders sent by post should be registered.

The lowest or any Tender will not necessarily be accepted.

City Hall, Belfast. 19 Feb., 1954. — JOHN DUNLOP, Town Clerk.

(G 739)

BOROUGH OF YEOVIL
Public Lighting Scheme 1954-55

TENDERS are invited for the following:

(*a*) The supply of 36 No. 25 feet mounting height and 12 No. 15 feet mounting height steel columns for electric street lighting.

(*b*) The supply and erection of lanterns, lamps and equipment for 36 No. 250 watt mercury lamps, 7 No. 80 watt mercury fluorescent lamps and 5 No. 100 watt tungsten lamps, together with the erection only of the steel columns mentioned in (*a*) above.

Persons may tender for either or both of (*a*) and (*b*) above.

Contract documents may be obtained from and drawings inspected at the office of the undersigned.

Sealed tenders, in the official envelope provided, must reach the Town Clerk not later than 10 a.m. on Monday 22 Mar., 1954.

The Council do not bind themselves to accept the lowest or any tender.

A. HEAL, M.I.MUN.E., Borough Surveyor.

Municipal Offices, King George St, Yeovil. (G 741)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ELECTRICITY SUPPLY BOARD
Ireland

VACANCIES FOR MECHANICAL SUPERVISORS (a) PIGEON HOUSE GENERATING STATION AND (b) ARDNACRUSHA GENERATING STATION

APPLICANTS must be qualified mechanical fitters, preferably with thermal power station experience.

Salary scale, including present C.L.B.—£574 p.a. to £980 p.a.; entry point according to qualifications and experience. Twelve months' probation. Positions pensionable.

Applications stating age, details of apprenticeship, training and experience, and indicating position sought, should reach the Personnel Officer, Electricity Supply Board, 27 Lower Fitzwilliam St, Dublin, not later than Saturday, 13 Mar., 1954.

PATRICK J. DEMPSEY, Secretary.

(G 727)

BRITISH ELECTRICITY AUTHORITY
South Wales Division

Vacancy No. 8/54

APPLICATIONS invited for superannuable N.J.B. appointment of SECOND ASSISTANT ENGINEER (Testing, Efficiency and Combustion), in the Generation (Operation) Department, Divisional Headquarters. Salary Class AX/CX, Grade 2. £834/£1,025 per annum.

Experience required of organising and carrying out acceptance tests on new generating station plant; routine plant tests; investigation of operation difficulties and improving plant performance; standardisation and calibration of test instruments; compiling test reports.

Application forms obtainable from THE SECRETARY, South Wales Division, British Electricity Authority, Twyn-y-fedwen Rd, Gabalfa, Cardiff, should be returned by 5 Mar., 1954. (G 743)

CARMARTHENSHIRE EDUCATION COMMITTEE
Llanelly Technical College

APPLICATIONS are invited for the post of HEAD of the College Department of Engineering and Building.

Candidates must be Graduates of a British University in Electrical or Mechanical Engineering with teaching experience in a recognised Institution and industrial experience.

A knowledge of building subjects generally would be an added qualification.

Salary in accordance with the Burnham Technical Scale for a Grade II Head of Department at present £1,040 x £25 to £1,190 per annum.

Application forms, which must be returned within TWO WEEKS of the appearance of this advertisement, may be obtained from the undersigned on receipt of a stamped addressed envelope.

IORWERTH HOWELLS, Director of Education.

Education Department, County Hall, Carmarthen. (G 747)

KENT EDUCATION COMMITTEE
Dartford Technical College

APPLICATIONS are invited for the appointment as from 1 Sept., 1954, of HEAD OF THE DEPARTMENT of Electrical Engineering. Salary Grade II Burnham Technical Scale. Candidates should have organising ability with good degree in Electrical Engineering or equivalent qualification, industrial experience in either Heavy or Light Current Electrical Engineering, and teaching experience. Further particulars may be obtained from the Principal, Dartford Technical College, Lowfield St, Dartford. (G 668)

THERMAL POWER STATION
At Trombay near Bombay (India)

APPLICATIONS are invited from qualified Engineers for selection for training and recruitment as SHIFT CHARGE and COMBUSTION ENGINEERS to operate the highe pressure Steam Power Station the Tata Hydro-Electric Companies are building at Trombay. Applicants must not be older than 40 years and must have a Diploma in Mechanical Engineering or in Mechanical and Electrical Engineering from a recognised technical college or Institute and should have at least 5 years' experience in a responsible capacity in the operation of large power stations, or in the erection and commissioning of large power plant equipment. Candidates should indicate when they can join and should be prepared to undergo successfully specialised practical trainings that the Companies may arrange for selected operating personnel. The training programme will commence early in April 1954.

Applications in duplicate stating qualifications, experience and approved references should be addressed to the undersigned who will furnish further details to candidates possessing the requisite qualifications. All applications to be submitted on or before 8 Mar.

N. REDFORD, Tata Limited.

18, Grosvenor Place, London, S.W.1. (G 708)

BRITISH ELECTRICITY AUTHORITY
East Midlands Division

APPLICATIONS are invited for the following positions within the Division:

ENGINEERING DRAUGHTSMEN
(CIVIL)
CONSTRUCTION DEPARTMENT
Vacancy No. 1/54.

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with official and administrative buildings.

The salary will be in accordance with Grade 5 (£567/£671 per annum) or Grade 6 (£433/£567 per annum) of Schedule D of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN
(MECHANICAL)
CONSTRUCTION DEPARTMENT
Vacancy No. 2/54.

Senior Draughtsmen are required in the Mechanical Section of the Construction Department at North Wilford Power Station. Candidates should have experience in one or more of the following:

(i) Design and layout of Power Station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
(ii) H.P. and L.P. steam and feed pipework. Condensing plant and feed heating systems.
(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

The salary will be in accordance with the National Joint Board Agreement, Grade 5 (£567/£671 per annum) and Grade 6 (£433/£567 per annum) of Schedule D according to experience.

ENGINEERING DRAUGHTSMEN
(ELECTRICAL)
CONSTRUCTION DEPARTMENT
Vacancy No. 3/54

Candidates should have experience in the preparation of layouts and diagrams for the installation of E.H.T. and L.T. switchgear, transformers, E.H.T. and L.T. cables: knowledge of protective gear systems would be an advantage.

The salary will be in accordance with the National Joint Board Agreement, Grade 5 (£567/£671 per annum) and Grade 6 (£433/£567 per annum) of Schedule D according to experience.

RESIDENT ENGINEER (CIVIL)
NORTHAMPTON POWER STATION
Vacancy No. 22/54

Preference will be given to applicants who have a degree in Civil Engineering, are Corporate Members of the Institution of Civil Engineers or possess equivalent qualifications. They should have had experience in the administration of large Civil Engineering contracts, and be able to supervise the setting out and progress of the works, which include heavy pile foundations, culverts, structural steelwork, buildings and the like.

Salary for this appointment will be within Class AX/DX, Grade 2 (£834/£1,053 per annum), of the National Joint Board Agreement.

The closing date for this appointment is 4 Mar., 1954.

WAYLEAVE OFFICER
DIVISIONAL HEADQUARTERS
Vacancy No. 25/54

Candidates should be of good education and have experience of negotiating with owners of property to arrange Wayleaves connected with the erection of overhead transmission lines, settlement of damage to crops, etc., during erection of lines.

Knowledge of tree cutting and valuation and Estate Management desirable.

The successful applicant will be required to provide a car for this appointment for which appropriate allowance will be made.

The salary will be in accordance with Grade 3 (£520/£580 per annum) of the National Joint Council Agreement.

The closing date for this advertisement is 11 Mar., 1954.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

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Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(G 720)

EASTERN ELECTRICITY BOARD
Northmet Sub-Area

APPOINTMENT OF SENIOR DRAUGHTSMAN—SUB-AREA HEADQUARTERS
(Ref.: No. 423)

APPLICATIONS are invited from candidates having the requisite training and experience for the position of SENIOR DRAUGHTSMAN on the staff of the Sub-Area Engineer.

The duties include layout of switchgear, transformers and associated equipment for outdoor and indoor type Substations up to 33 kV.

The salary will be in accordance with Schedule D, Grade 5, of the National Joint Board Salary Agreement within a range of £567/£671 plus London allowance, commencing at a point dependent upon qualifications and experience. Future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications by letter stating age, education, technical qualifications and experience, with details of present appointment and salary should be submitted to the Manager, Northmet Sub-Area, Eastern Electricity Board, Northmet Hse, Southgate, London, N.14, within fourteen days of the appearance of this advertisement. (G 731)

BRITISH ELECTRICITY AUTHORITY
Southern Division

APPLICATIONS are invited for a post as GRADE 10 ENGINEER,
Oxford Generating Station.

The principal duties of the person appointed will be concerned with the maintenance of the instruments in the station, but he will also have an opportunity of gaining valuable experience of responsibility in other fields, including electrical maintenance and coaling.

Applicants should have had a sound technical training, and should preferably be studying for membership of a recognised professional institution.

Salary N.J.B. D.10, £531/£547.

Special application forms, obtainable from P. D. A. OLIVER, Divisional Secretary, 111 High St, Portsmouth, should be returned by 10 Mar., 1954. (G 730)

THE NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT of (*a*) SECOND ASSISTANT ENGINEER (Power Sales) (*b*) THIRD ASSISTANT ENGINEER (Power Sales), Sub Area CONSUMERS' ENGINEER'S DEPARTMENT, Blackburn.

Applicants for (*a*) must have had experience in the development of industrial sales, with particular reference to the Textile and Engineering Industries, Public Lighting and D.C. to A.C. Changeover investigations, and have obtained the H.N.C. in Electrical Engineering.

Applicants for (*b*) should have had practical training and preferably electrical engineering experience in the utilisation of electricity in industry. Preference given to applicants who possess the H.N.C. in Electrical Engineering.

Salary Scales: Post (*a*) £817/£852 p.a., Grade J.7, N.J.B. Conditions. Post (*b*) £680/£706 p.a., Grade J.10, N.J.B. Conditions.

Note.—Persons who applied in response to previous advertisement for Post (*a*) need not re-apply.

Applications, stating post for which application is made, to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee St, Blackburn, by 6 Mar., 1954. (G 664)

BRITISH ELECTRICITY AUTHORITY
Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of STATION SHIFT CONTROL ENGINEER at the Percival Lane Power Station, Runcorn, Cheshire. Salary £608/£630 per annum, N.J.B. Class G, Grade 10. Superannuable and subject to medical examination.

Applicants should have had a good general and technical education and experience in the control room of a power station. Possession of Higher National Certificate or equivalent qualifications would be an advantage.

Application Forms may be obtained from the Divisional Secretary, Beaconsfield Rd, Woolton, Liverpool. Closing date: 9 Mar., 1954. (G 726)

BRITISH ELECTRICITY AUTHORITY
South Eastern Division

ASSISTANT MAINTENANCE ENGINEER (Electrical)—Croydon "B" Power Station. Applicants should preferably possess Higher National Certificate and must have had experience in the maintenance of alternators, E.H.T. switchgear and motors, all electrical and auxiliary plant and in the control of labour. N.J.B. Conditions of service and salary, Class J, Grade 9, £754. 19s. per annum including London allowance. Applications should be received by the Station Superintendent, Croydon "B" Power Station, Beddington Farm Road, Croydon, Surrey, by 6 Mar. (G 732)

BRITISH ELECTRICITY AUTHORITY
London Division

APPLICATIONS are invited for the following superannuable posts. Conditions of service in accordance with N.J.B. Agreement, Schedule A or C. Salary includes London Allowance. Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. for posts (*a*) and Corporate Membership for posts (*b*) an advantage.

(*b*) THIRD ASSISTANT ENGINEER,
Transmission Department

Experience required in laying, jointing and testing of underground cables up to 132 kV and also have works experience in the design and manufacture of cables. Salary—Class AX, Grade 5 within range £681. 9s. to £829. 10s. rising to ultimate max. of £927. 3s. p.a. Applicants in reply to previous advert will be considered and need not re-apply.

(*a*) JUNIOR ENGINEER,
Hackney Generating Station

Good technical training with Generating Station experience desirable. General duties in Generating Station operation. Salary—Class F, Grade 14=£491 p.a.

(*a*) ASSISTANT INSTRUMENT ENGINEER,
Fulham Generating Station

Applicants should have a comprehensive knowledge of the repair and testing of all types of generating station instruments. Salary—Class L, Grade 13=£646. 16s. p.a.

Application may be made on form obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland St, W.1, and be received within 14 days of this advertisement. (G 719)

NORTH THAMES GAS BOARD

A TECHNICAL ASSISTANT, about 30 years of age, is required for lighting, heating and ventilating work in the Building and Property Maintenance Department at FULHAM, S.W.6.

Candidates, who should be capable, under supervision, of planning electric lighting installations and lay-outs for premises other than gas works, and also of preparing specifications and estimates, must have sound theoretical and practical knowledge, with some drawing office experience.

Starting salary, according to age and experience, would be in the region of £620 per annum.

Applications, giving age and full particulars of qualifications and experience, should be sent to the Staff Controller, North Thames Gas Board, 30 Kensington Church St, London, W.8, quoting reference 666/143, to reach him within ten days of the publication of this advertisement. (G 724)

BRITISH ELECTRICITY AUTHORITY
Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of SENIOR DRAUGHTSMAN (ELECTRICAL) in the Construction Department, Divisional Headquarters, Springwood House, Woolton, Liverpool. Salary within the range of £567/£671 per annum, Grade 5, Schedule "D," to the N.J.B. Agreement. Superannuable and subject to medical examination.

Applicants should have a good general and technical education, preferably possess the Higher National Certificate in Electrical Engineering and have had some experience in Drawing Office associated with the construction of modern power station and/or an electrical plant manufacturing works. Some workshop experience would be an advantage.

The successful applicant will be required to prepare drawings and diagrams associated with power station electrical plant and equipment, and check drawings and diagrams submitted by contractors.

Application Forms from the DIVISIONAL SECRETARY, Beaconsfield Rd, Woolton, Liverpool. Closing date: 1 Mar., 1954. (G 673)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of THIRD ASSISTANT ENGINEER (Planning) on the Chief Engineer's Staff at the Headquarters of the Midlands Electricity Board, Mucklow Hill, Halesowen, concerned with the technical investigations and calculations associated with the planning of Transmission and Distribution Systems. Applicants should have received thorough training in the Electricity Supply Industry and should have experience in the Planning and Operation of H.V. and L.V. Distribution Systems. Technical qualifications desirable.

Commencing salary within the range £649/£790 per annum, according to qualifications and experience, ultimately rising to £883 per annum. (N.J.B. Schedule "C," Grade 5 AX/EX). Superannuable.

Apply in writing stating age, experience, present salary and position to: Secretary (FWC), Midlands Electricity Board, Mucklow Hill, Halesowen, near Birmingham.

A. STEPHENS,
Secretary.
(G 728)

BRITISH ELECTRICITY AUTHORITY
South Wales Division

Vacancy No.10/54.

APPLICATIONS invited for superannuable N.J.B. appointment of GENERAL ASSISTANT ENGINEER, Technical Department, Divisional Headquarters. Salary AX/CX, 8. £501/£675 per annum.

H.N.C. and/or Electrical Engineering Degree. Apprenticeship with large electrical manufacturers and experience that would fit the applicant for commissioning and handling electrical problems in power station and transmission systems desirable.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-fedwen Rd, Gabalfa, Cardiff, should be returned by 9 Mar., 1954. (G 718)

BRITISH ELECTRICITY AUTHORITY
Headquarters

APPLICATIONS are invited from suitably qualified candidates for position of DEPUTY CHIEF ENGINEER (transmission) in the Chief Engineer's Department.

The person appointed will be responsible to the Chief Engineer for all matters relating to the Design, Construction and Operation of the Authority's main transmission system.

The salary will be within the provisional scale £3,000 rising by annual increments of £125 to £3,500.

Letters of application stating age, qualifications, experience, present position and salary, should be forwarded to D. Moffat, Director of Establishments, British Electricity Authority, Winsley St, London, W.1, by Monday, 8 Mar., 1954. Quote ref. ET/457. (G 716)

COLONIAL ENGINEERING SERVICE

A LIMITED number of vacancies are available in the Colonial Service (mainly in Africa and the Far East) for PUPILS and PROBATIONERS in Civil Engineering and for PUPILS in Mechanical and Electrical Engineering (including Telecommunications).

Candidates should have passed, or hold a University degree or other qualification which exempts from, the Final Parts I and II of the examinations for Associate Membership of the Institution of Civil Engineers, or Sections A and B of the examinations of the Institutions of Mechanical or Electrical Engineers. Engineering students whose degree examinations take place later this year may apply and will, if selected, be offered appointment subject to their passing their final examinations.

Applications should reach the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith St, London, S.W.1, in writing, by 15 Mar., 1954, and should give brief details of candidate's age, qualifications and experience, quoting reference CDE 100/011. Further details supplied on request. (G 632)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

APPLICATIONS are invited for the post of ASSISTANT ENGINEER (Technical) at Dingwall. Salary £633/£643 (N.J.B. D/7). Superannuation Scheme applicable.

Applicants must be Chartered Electrical Engineers or hold a degree in electrical engineering and should have experience in the commissioning and maintenance of switchgear and protective gear and able to deal with technical correspondence.

The successful applicant will be required to take charge of maintenance work in substations throughout the Northern Area and this will include maintenance of 132 kV switchgear, 33 kV and 11 kV switchgear and protection, etc.

Application forms, obtainable from Area Manager, Northern Area, Church St, Dingwall, should be returned by 15 Mar., 1954. (G 660)

LONDON ELECTRICITY BOARD
Structural Assistants and Structural Draughtsmen

APPLICATIONS are invited for the above positions in the Construction Branch of the Chief Engineer's Department in Central London.

Applicants for the positions of Structural Assistants in the Civil Engineer's Section should have experience in the design and detailing of reinforced concrete heavy foundations, framed superstructures and other structural works. Applicants for Structural Draughtsmen should have experience in detailing reinforced concrete structures.

The posts are graded under Schedule "D," National Joint Board agreement as Grade 5—£595. 7s. to £704. 11s. and Grade 6—£458 to £595. 7s. per annum respectively, inclusive of London Allowance. Commencing salary will be dependent upon qualifications and experience.

Application forms obtainable from Personnel Officer, 46 New Broad St, E.C.2, to be returned within 10 days from the publication of this advertisement. Please enclose addressed foolscap envelope and quote ref. V/1716/T. on all correspondence. (G 722)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

COMMERCIAL ASSISTANTS required to be based on Flint and Rhuddlan in the Board's No. 4/5 Sub-Area. Salaries £524/£540 p.a. (N.J.B. E/11).

Applicants should have an Engineering training, experience in dealing with installation work, consumers' supply inquiries, and general commercial duties.

The appointments are superannuable and subject to medical examination.

Standard application forms obtainable from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, near Wrexham. Closing date: 8 Mar., 1954. (G 745)

SINGAPORE CITY COUNCIL
Electricity Department

BOILER HOUSE SHIFT ENGINEER, 1st Class B.o.T. (Steam) and G.I.MECH.E., required on a 3-years' agreement in first instance. Minimum age 24. Total emoluments for (1) a single man, (2) married man with no children and (3) married man with one or more dependent children respectively are: £1,449, £1,556 and £1,677. Qualified applicants may obtain full particulars from Messrs Allen and Williams, 1 Victoria St, London, S.W.1. Full applications in DUPLICATE before 18 Mar., 1954. (G 669)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

COMMERCIAL ASSISTANT required in the Warrington District of the Board's No. 2 Sub Area.

Salary within the range £548/£565 per annum (N.J.B. F/11).

Applicants should have had a sound technical training and, preferably, possess the qualifications necessary to enable them to become Chartered Electrical Engineers.

Duties include estimating for contracting work and advising consumers on electricity supply matters and appliances.

The appointment is superannuable and subject to medical examination.

Standard application forms obtainable from the Manager, No. Sub Area, Sandiway Hse, Nr. Northwich, Cheshire.

Closing date: 8 Mar., 1954. (G 734)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

COMMERCIAL ASSISTANT required in the North Wirral District to be based at Birkenhead. Salary within the range £573/£596 per annum (N.J.B. C/11).

Applicants should have had a sound technical training and preferably possess the qualifications necessary to enable them to become Chartered Electrical Engineers. Duties include estimating for contracting work and advising consumers on electricity supply matters and appliances.

The appointment is superannuable and subect to medical examination.

Application forms obtainable from the Manager, No. 3 Sub-Area, Electricity House, Newgate St, Chester, must be returned not later than 8 Mar., 1954. (G 746)

BRITISH ELECTRICITY AUTHORITY
South Eastern Division

GENERAL ASSISTANT ENGINEER to act as instructor at the new DIVISIONAL TRAINING CENTRE, BRIGHTON. The centre will be opened shortly and comprises—workshops, lecture rooms, etc. Candidates must have served a recognised workshop apprenticeship and have experience of instructing in the use of hand and machine tools, fitting and turning, methods of heat treatment, elementary electrical practice, etc. The duties will include the supervision and instruction of craft and student apprentices and graduate trainees in basic workshop practice, the necessary demonstrating, lecturing and general clerical work in connection with the centre. Commencing salary within the range of £501 to £720. Class "AX," Grades 8—6 of the N.J.B. Agreement, according to qualifications and experience. Applications giving details of education, present position, experience, etc., should be received by the Establishments Officer, British Electricity House, Lower Ham Rd, Kingston-upon-Thames, Surrey, by 6 Mar., 1954. (G 717)

SINGAPORE CITY COUNCIL
Electricity Department

JUNIOR TECHNICAL ASSISTANT, G.I.E.E., required on a 3-years' agreement in first instance. Minimum age 28. Total emoluments for (1) a single man, (2) married man with no children and (3) married man with one or more dependent children respectively are: £1,771, £1,918 and £2,093.

Qualified applicants may obtain full particulars from Messrs Allen and Williams, 1 Victoria St, London, S.W.1. Full applications in DUPLICATE before 16 Mar., 1954. (G 666)

BRITISH ELECTRICITY AUTHORITY
Midlands Division

GENERAL ASSISTANT ENGINEER is required in the System Operation Department. N.J.B. service conditions, superannuable appointment, salary within Schedule C, Grade 8, commencing in range £501 to £639 ultimately rising to £694 per annum.

Applicants should possess Higher National Certificate in electrical engineering or an equivalent qualification, and preferably should have had power station experience. Duties will include some shift work.

Apply on form AE6, quoting Vacancy No. 613 MD, available from the Establishments Officer, 53 Wake Green Rd, Moseley, Birmingham 13, by 13 Mar., 1954. (G 725)

BRITISH ELECTRICITY AUTHORITY

HEADQUARTERS, require a GENERAL ASSISTANT ENGINEER in the GENERATION PLANT DESIGN Sub-Area to assist in investigations into design problems associated with turbines, condensers and feed heaters. Candidates, preferably with a degree in Mechanical Engineering, should have some experience with a manufacturer of one of the above items of plant. Salary N.J.B. Grade 5, £558/£769 p.a. inclusive. Forms from D. MOFFAT, Director of Establishments, British Electricity Authority, Winsley St, London, W.1, to be returned by 12 Mar., 1954. Quote Ref. AE.454. (G 689)

FOREMAN ELECTRICIAN

REQUIRED by the KENYA GOVERNMENT PUBLIC WORKS DEPT. for one tour of 40-48 months in the first instance. Salary, etc., according to experience in scale £742 rising to £965 a year. Gratuity at rate of £74/£96 a year. Outfit allowance £30. Free passages. Liberal leave on full salary. Candidates should have served an apprenticeship with a reputable firm of Electrical Contractors or with an Electricity Undertaking on electrical installation work and should have had subsequent wide experience in their trade. They should be capable of acting as Clerk of Electrical Works.

Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/30398/EE. (G 733)

SOUTH EASTERN ELECTRICITY BOARD

THIRD ASSISTANT ENGINEER
(Central Sussex District)

SALARY £587/£600 p.a. under N.J.B. Class E, Grade 9. Superannuable. The District is mainly rural. Applicants should be suitably qualified and have had training and experience in the construction, operation and maintenance of underground and overhead distribution systems. Preference will be given to candidates having experience up to and including 33 kV.

Residential accommodation will be offered to the successful applicant.

Applicants, giving 2 referees, must reach Arthur Barnes, M.I.E.E., Central Sussex Manage, SEEBoard, Electra Hse, Church Rd, Haywards Heath, Sussex, by 12 Mar., 1954.

SENIOR SALES REPRESENTATIVE
(Croydon District)

Salary £460 x £20—£520 plus London Weighting under N.J.C. Grade 2. Applicants should have had experience in consumer service, tariffs, sales of electrical appliances and preparation of wiring estimates.

Applications, giving 2 referees, on forms obtainable from H. Lowe, M.I.E.E., District Manager, SEEBoard, Electric Hse, Wellesley Rd, Croydon, by 12 Mar., 1954.

A. L. BURNELL,
Secretary.
(G 735)

SOUTH EAST ESSEX TECHNICAL COLLEGE
Longbridge Road, Dagenham

REQUIRED September:

(i) SENIOR LECTURER IN ELECTRICAL ENGINEERING for Measurements and Machines or Supply. Expected to develop courses and laboratories and assist in general administration of Department. Salary (under review) £1,040 x £25—£1,190 plus London allowance.

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(ii) ASSISTANT GRADE B FOR ELECTRICAL INSTALLATION work for City and Guilds Courses and Electrical Technology to O.N.C. level. To be responsible for development of Installation courses and Laboratory. Ability to teach Engineering Science an advantage. Salary (under review): £490 x £25—£765 (man), plus degree (or equivalent) and training additions and increments for previous recognised experience.

Further details and form from Clerk to Governors (S.A.E.). (G 729)

SOUTHERN ELECTRICITY BOARD
Service Representatives

TROWBRIDGE (Melksham District), Woodstock (Oxford District), Marlow, Wallingford (Reading District), and Swindon (Swindon District), all of No. 2 (Newbury) Sub-Area.

Salary: N.J.C. Grade 2 (£460/£520 per annum). N.J.C. Conditions of Service.

The successful applicants will be required to advise on supply matters, tariffs and electrical apparatus and to promote sales, and will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on the standard form obtainable from the Sub-Area Secretary, 7 Oxford Rd, Newbury, and returned to him in envelopes suitably endorsed not later than 12 Mar., 1954. (G 721)

BRITISH ELECTRICITY AUTHORITY
North Western Division

VACANCY No. 24/54 — STATION SHIFT CONTROL ENGINEER, Barrow Generating Station. Salary £531/£547 (D.10).

Vacancy No. 25/54—TURBINE HOUSE SUPERINTENDENT, Kearsley Generating Station, Stoneclough, near Manchester. Salary £936/£977 (K.6).

Vacancy No. 27/54—ASSISTANT SHIFT CHARGE ENGINEER, Lancaster Generating Station. Salary £607/£629 (F.9).

Applications, quoting vacancy No. and stating age, qualifications, experience, etc., should be sent to Establishment Officer, British Electricity House, 825 Wilmslow Rd, Manchester 20, before 6 Mar. (G 667)

APPLICATIONS are invited by THE ENGLISH ELECTRIC CO., LTD., for engineers having wide experience in the preparation of comprehensive and specialised schemes of machine control. Applicants must be of Higher National Certificate standard and capable of preparing schemes in detail. Apply quoting ref. 1244 to Dept. C.P.S., 336/7 Strand, W.C.2. (G 564)

BROCKHIRST SWITCHGEAR LTD., CHESTER, invite applications for the position of DEVELOPMENT MANAGER. Duties will include full responsibility for the development and design of all types of electric control gear and the work of the Laboratory, Drawing Office and Workshop of the Development Department. Applicants should be professional electrical engineers who have had considerable experience in the development and design of electrical equipment, preferably in relation to control gear. This is a senior appointment carrying a good starting salary. Apply giving particulars of age, education, training and experience, and salary required to Group Personnel Officer, Metal Industries Ltd., Victoria Station House, London, S.W.1. (G 693)

DRAUGHTSMEN. The General Electric Company Limited, Witton, Birmingham 6, requires men experienced in any of the following:

1. Design of circuit-breakers and metal-clad switchgear.
2. Layout of industrial contactor control boards.
3. Power Station control boards.
4. Diagrams of connections for power schemes.

Applications from good mechanical draughtsmen are also invited. Apply, stating age, experience and salary required to the Staff Manager. (G 699)

BROOKHIRST SWITCHGEAR LTD., Chester, wishes to appoint a SALES DEVELOPMENT ENGINEER specialising in electric control gear for the Electricity Supply Industry. Applicants, who must be professional electrical engineers, should have had extensive commercial and technical experience in relation to the Electricity Supply Industry, particularly with regard to the specification and installation of electric drive and control for Power Station Auxiliaries. The man appointed will be required to accept full responsibility for sales development and promotion in this specialised field in both the Home and Overseas markets. The position carries a good starting salary commensurate with the degree of responsibility and level. Apply giving particulars of education, training, experience, age and salary required to Group Personnel Officer, Metal Industries Ltd., Victoria Station Hse, London, S.W.1. (G 742)

DENIS FERRANTI METERS LIMITED, Bangor, North Wales, require Engineer to take charge of section engaged in design of Watthour Meters and association equipment. Pleasant seaside district. House available in near future. Write giving full details in confidence, to Chief Engineer. (G 694)

DEVELOPMENT ENGINEER for firm making telemetering and light electro-mechanical equipment. Duties include preparation of technical information for sales and publicity. At least O.N.C. London Area. Write giving details of experience.—Box No. 3321, Electrical Times. (G 704)

DEVELOPMENT DRAUGHTSMAN required for control gear and switchgear up to 11 kV. Apply stating age, experience, technical qualifications and salary, to ERSKINE, HEAP AND CO., LTD., Lancashire Switchgear Works, Salford, Manchester 7. (G 655)

DRAUGHTSMEN. The General Electric Company Limited, Witton, Birmingham 6, has vacancies for senior men experienced in large A.C. and D.C. machines, including Turbo and Waterwheel Alternators, and experienced Jig and Tool Design Draughtsmen. Apply giving details of qualifications, experience and salary required to the Staff Manager. (G 700)

ELECTRICAL / MECHANICAL ENGINEERING ASSISTANT required by Hayes and Harlington U.D.C. Salary APT. Va—£625 to £685 plus "Weighting." Increase of £25 p.a. w.e.f. 1/4/54. Preference given to holders of Higher National Certificate of one or other of the Institutions of Mechanical or Electrical Engineers. Applicants should have good general experience, including provision and maintenance of electrical installations in buildings. Experience in street lighting and the operation and maintenance of motor transport will be an advantage. Application form from Engineer and Surveyor, Town Hall, Hayes, Middx., to be completed and returned by 15 Mar., 1954. (G 690)

POWER STATION CHEMIST required for service with the Government of Kuwait, Persian Gulf. The minimum technical qualification required is the Higher National Certificate in chemistry, or its equivalent, and age should be under 35 years. Applicants should have had at least three years' experience as Power Station Chemist and have a thorough knowledge of the chemical testing and control of modern boiler plant water treatment processes. Full details of qualifications and experience must accompany the application. The salary offered is up to £1,500 per annum according to experience. Free furnished quarters and free medical attention are provided. The first year will be probationary and home leave will be granted at the end of three years' service. Married accommodation cannot be promised during the first year of service. Applications in the first place to be addressed to the Secretary, Ewbank and Partners Limited, Engineering Consultants, 10/11 Grosvenor Place, S.W.1. (G 695)

DRAUGHTSMAN SENIOR required for switchgear contracts work, experienced on cubicle, truck and flat back type of gear up to 11 kV, including diagram work. Apply stating age, experience, technical qualifications, and salary, to ERSKINE, HEAP AND CO., LTD., Lancashire Switchgear Works, Salford, Manchester 7. (G 655a)

ELECTRICAL ENGINEER wanted for the Belgian Congo to be responsible to the Chief Engineer for the entire electrical maintenance of seven medium size factories and numerous small factories and outstations. The installations comprise 10·5 kV switchgear and ring mains, transformers, 380 V M.T. switchgear and distribution, steam and diesel driven A.C. and D.C. generating sets, motive power, heating, lighting and telephones. The staff under his control would include several European and a number of African electricians.

Applicants, who should be between 27 and 35, should be of good physique and in good health.

Sound practical training and some years of experience and responsibility as electrical engineer of a factory or group of factories essential. Lowest technical qualifications would be H.N.C. (EE). Preference given to an A.M.I.E.E. whose experience has covered the training of personnel. Good working knowledge of French important.

Good superannuation scheme, wife and family allowance, free house and medical attention. Tour two-and-a-half years followed by 5 months' leave on pay. Starting salary would be Belgian franc equivalent of £1,500 to £1,750 p.a. (inclusive of cost of living allowance), depending on experience, qualifications and age.

Write with full particulars to Box No. 7424 c/o CHARLES BARKER AND SONS LTD., 31 Budge Row, London, E.C.4. (G 709)

ELECTRICAL ENGINEERS (3), Associate Members or Graduates of the Institution of Electrical Engineers, with experience in designing and supervising electrical installations in various types of buildings, to act in a professional capacity. Must have knowledge of all recognised methods of wiring and be conversant with relevant regulations. Good personality and address essential. Aged preferably between 28/35. Superannuation scheme. Reply to Box No. 3323, Electrical Times, giving full details of education, training, qualifications, experience and salary required. (G 705)

ENGINEER required for technical service to production unit making light electro-mechanical devices and motors. Experience of development work and trouble-shooting desirable. London Area. Write stating full particulars.—Box No. 3319, Electrical Times. (G 703)

ELECTRICAL ENGINEER required for Electrical Department of Works in the North-East. Should have a sound practical training, drawing office experience, a knowledge of motor control gear resistance calculations, and preferably some experience of electrical heating for industrial applications. Apply giving full details of experience, technical qualifications, age, whether married or single and salary required, to—Box No. 3265, Electrical Times. (G 580)

ELECTRICIAN required for installation work on electrical equipment associated with Furnaces and ancillary equipment in Steelworks and Glassworks. Good salary, pension scheme, interesting job calling for liaison with customers electrical staff. Must be prepared to travel and should have had experience of A.C. and D.C. motors and control schemes from F.H.P. to 200 h.p. Apply by letter with details of age, experience, etc., endorsing envelope "Electrician," Stein and Atkinson Ltd., Parnell House, 25 Wilton Rd, London, S.W.1. (G 583)

EXPERIENCED TRANSFORMER DRAUGHTSMAN required for progressive Company in Manchester area. Must be able to work on own initiative on transformers up to 1,000 kVA, 33 K.V. Progressive post.—Box No. 3313, Electrical Times. (G 627)

PRODUCTION ENGINEER

with experience of powder-filled tubular-sheathed heating elements required to control and expand established department. Full understanding of manufacturing technique and ability to develop and improve production methods essential. This is a senior appointment with excellent prospects. Please apply with full details of experience in this field to the **Secretary, Simplex Electric Company Limited, Blythe Bridge, Staffordshire.** (G 691)

ELECTRICAL ENGINEER appointments with Atlas Lighting Division, Thorn Electrical Industries Ltd. Sound theoretical knowledge and experience in (*a*) illuminating engineering and technical writing (*b*) production engineering, Government specifications and tenders for fluorescent lighting equipment. Good salary. 5-day week. Pension Scheme. Apply in writing: Staff Manager, 105/109 Judd St, London, W.C.1. (G 715)

ELECTRICAL DESIGNERS and DRAUGHTSMEN required permanently. Experience in Lighting and Power Installations for Schools, Hospitals and other large institutions. Five-day week. Excellent prospects. Interview expenses refunded. Confidential Applications to E. G. Phillips, Son and Norfolk, Consulting Engineers, Arskus House, Annesley Grove, Nottingham. (G 609)

KENT COUNTY COUNCIL require an ENGINEERING INSPECTOR with practical experience in electrical and/or heating and hot water installations. Salary £625 x £20—£685 a year. Further details and forms of application may be obtained on application to the County Architect, Springfield, Maidstone. (G 723)

LEADING STEAM TURBINE MANUFACTURER requires several experienced SENIOR SALES ENGINEERS to handle estimates and tenders for home and export inquiries. Applications, stating age, experience and qualifications to—Box No. 3273, Electrical Times, quoting ref. DJD. (G 606)

MECHANICAL ENGINEER with good technical qualifications required for 80 MW industrial power station. Age not less than thirty. Commencing salary £950 to £1,100. Non-contributory pension scheme. Up-to-date power station experience essential. Apply in writing to Salaried Personnel Department, Ford Motor Company Limited, Dagenham, Essex, quoting reference TME/9. (G 706)

M.K. ELECTRIC LTD. require a REPRESENTATIVE for the Eastern Counties. Applicants, who should be car owners, must have first-rate contacts throughout the area. Apply in strict confidence to Sales Manager, M.K. Electric Ltd., Wakefield St, London, N.18. (G 624)

NETTLE Accessories Ltd., Harper Rd, Wythenshaw, Manchester, require a representative for North London and Eastern Counties area. Car essential. Must reside north side of the Thames. Apply in strict confidence to the Sales Manager. (G 692)

ORDER CLERK required for Electrical Wholesalers, Hammersmith district, able to answer the telephone and enter orders, must have knowledge of the Trade. Reply in confidence, stating age, experience and wages required to—Box No. 3283, Electrical Times. (G 628)

PROTECTIVE RELAY DEVELOPMENT ENGINEERS required by large Midlands electrical firm. Good salary and opportunity for advancement. Air-conditioned building, modern equipment. Please write giving full details and quoting reference ABDI to—Box No. 3297, Electrical Times. (G 640)

QUALIFIED ELECTRICAL ENGINEER required, conversant with the design and supervision of modern electrical and lift installations in industrial, commercial and domestic premises, to take charge of electrical department in large Architects' office. Salary £900—£1,000.—Box No. 3289, Electrical Times. (G 635)

JOHNSON AND PHILLIPS LTD

MANAGER OF CABLE TEST AND RESEARCH DEPARTMENT

APPLICATIONS are invited for the post of Manager of the Cable Test and Research Department. Candidates should hold a degree or its equivalent in Electrical Engineering, and should be a Corporate Member of the Institution of Electrical Engineers.

The appointment involves responsibility to the Managing Director for cable design and quality, and for all research and development work on cables.

Applicants should possess thorough experience of cable design and testing and to be familiar with modern cable specifications.

Apply by letter, stating full particulars of education, qualifications and experience to: **Managing Director, Johnson and Phillips Ltd., Victoria Works, Charlton, S.E.7.** (G 710)

REPRESENTATIVE WANTED by leading Electrical Repair Company. London area.—Box No. 3287, Electrical Times. (G 630)

TECHNICAL WRITERS are required to prepare instruction books and descriptive bulletins by THE ENGLISH ELECTRIC CO., LTD., Stafford. Applicants should be engineers having at least O.N.C. (electrical) experience of technical writing and an interest in rolling mill electrical equipment of the application of relays to protective schemes. Apply, quoting Ref. No. 1250, to Dept. C.P.S., 336/7 Strand, W.C.2. (G 642)

TOP CLASS ENGINEER, with production and planning experience required, Manchester district, to take charge of a small production unit specialising in high accuracy electronic components. Previous experience in this field is essential, and applicants must be conversant with Ministry procedure. This post offers outstanding opportunities for a young energetic candidate: it must be filled quickly so that early application should be made. Write stating age, qualifications and experience in confidence, to—Box No. 3305, Electrical Times. (G 657)

THE General Electric Co., Ltd., require an experienced TRACTION ENGINEER for tender and project work in connection with electric and diesel electric projects. Applications giving full details of age, experience and qualifications should be sent to the Staff Manager, G.E.C., Magnet House, Kingsway, W.C.2. (G 713)

WANTED by firm of Electrical and Mechanical Engineers in Lancashire, Manager for their Electrical Installation department. Must be capable of designing, estimating and supervising all types of installation. Please give details of experience and salary required.—Box No. 3317, Electrical Times. (G 702)

WHIPP AND BOURNE LTD., Switchgear Works, Castleton, Rochdale, require two Draughtsmen. workshop experience and O.N.C. required. Apply in writing giving details of age and experience. (G 737)

WHIPP AND BOURNE LTD., Switchgear Works, Castleton, Rochdale, require Estimator. Write giving details of age and experience. (G 738)

YOUNG ENGINEERS with at least O.N.C. and practical manufacturing experience are required by THE ENGLISH ELECTRIC CO., LTD., Stafford, for estimating work on control gear related to rolling mill drives. Write quoting reference 1199A, to department C.P.S., 336/7 Strand, W.C.2. (G 641)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House Sardinia Street, London, W.C. 2

YOUNG ELECTRICAL ENGINEER required to assist with preparation and supervision of all light and heavy electrical work associated with furnaces and auxiliary equipment for steel and glass works. Basic knowledge of A.C. and D.C. motors and control schemes. Prepared to travel. Progressive and interesting job. Pension scheme. Apply, stating salary required, details of age, experience, etc., and endorsing envelope "Assistant Electrical Engineer," Stein and Atkinson Ltd., Parnell House, 25 Wilton Rd, London, S.W.1. (G 582)

APPOINTMENTS WANTED

A.M.I.E.E., ex assistant Naval Attache Moscow, speaks perfect Russian. Has been doing executive work for years, exp. in selling. At present a director of company, not electrical—seeks an opening.—Box No. 3279, Electrical Times. (G 613)

PARIS, ENGLISH, ELEC. ENGINEER seeks full or part-time post, advertising, agency, or liaison.—Box No. 3243, Electrical Times. (G 548)

WANTED

WANTED. ROTARY CONVERTERS, any size.—Universal, 221 City Rd, London, E.C.1. (G 6)

WANTED, for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady St, Bethnal Green, E.1. (G 1)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26, Britannia Walk, London, N.1. (G 4)

WORK WANTED

A.C. and D.C. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (G 13)

ARMATURE REWINDING service to the trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors. Vacuum cleaner and drill armatures replaced from stock 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make. Apex washer agitator shafts stocked.—Regam Electric Cleaner Service, 95, Park Lane, Leeds, 1. (G 20)

PERSPEX industrial safety guards. Exhibition Display fittings, Shop facia letters. Commercial, Display and Advertising Signs engraved, embossed and silkscreen printed in Perspex, P.V.C., etc. OLYMPIC PLASTICS LTD., Wembley Park, Middx. Wem 7933. (G 625)

REPETITION armature winding, Electrodynamic balancing, repairs, rewinds and conversions of high speed motorised equipment, all makes, sizes and types. Gilbert E.T.S. Ltd., 4 Clarence St, Nottm. (G 698)

WORK WANTED. Capacity available for all types of COIL WINDING.—Box No. 2425, Electrical Times. (G 17)

FOR SALE

A.A. ELECTRICAL CO. for A.C.-D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chi 5105, 67 Rothschild Rd, W.4. (G 7)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works Ltd., Milo Rd, East Dulwich, S.E.22 (Forest Hill 2278-9). (G 3)

A.C.-D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, London, N.W.4. (G 5)

A.C. and D.C. MOTORS, GENERATORS from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566-9. (G 9)

A HIGH VACUUM IMPREGNATION UNIT or single or batch coil impregnation service to R.I.C. Specification 214 or individual requirements. — Blickvac, 505 Lordship Lane, S.E.22. Tel.: Forest Hill 7089. (G 18)

CABLE/FLEX much cheaper in odd length coils. Short lengths supplied. Lists. BDC, 591 Green Lanes, London, N.8. (G 686)

DON'T worry about your electricity bills. Fit 1s. slot electric meters for hotels, bed-sitters, etc. Prices from 50s.—Selectrics, Department E.T., Castle Circus House, Torquay. Tel. 7218. Trade inquiries invited. Trade discount. (G 21)

DAVID-BROWN, Croft, Neco and other makes of Reduction Gears and Reduction Geared Motor Units. For detailed list with prices, apply: WHITEFIELD MACHINERY AND PLANT LTD., Cobden St, Pendleton, Salford, 6. (G 665)

FOR Sale 100,000 yds of Single 1/028 PVC Cable 27s. 6d. per thousand yds and 100,000 yds 1/032 PVC Cable £2 per thousand yds.

Also 15 cwt of 12G, 13G and 16G single cotton covered Copper Wire at 2s. 6d. per lb.

Approximately 5,000 yds of low impedence beaded air spaced Co-Ax 60 ft coils. Sample coil 5s. H. J. Boulting Ltd., 21 Wellington St, Leicester. Phone Granby 903. (G 662)

GENERATORS 540 kW 130/175 V, D.C. GENERATOR by Bruce Peebles. 4125/3075 amps. Shunt interpole, open type frames, split carcase. Suitable for direct coupling. Speed 428 r.p.m.

500 kW, 420/520/550 V, D.C. GENERATOR by Bruce Peebles, 1040/910 amps compound interpole, 3-wire, fitted 4 slip-ring. Speed 750 r.p.m.

250 kW GENERATOR by Met-Vick., for 500/440 V, D.C., 2-wire, 500 amps. Speed 375 r.p.m. Open type, compound wound.

200 kW GENERATOR by E.C.C., for 200 V, D.C., speed 1,000 r.p.m. Open type, single pedestal bearing. Compound wound, fitted interpoles.

200 kW GENERATOR by Mavour and Coulson, for 500 V, D.C., 400 amps. Speed 380 r.p.m. Open type, 6 pole, compound interpolar wound. Single pedestal R.O.B. George Cohen, Sons and Co., Ltd., Wood Lane, London, W.12. Tel.: Shepherds Bush 2070 and Stanningley, nr. Leeds, Tel.: Pudsey 2241. (G 736)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Rd, London, E.C.1. (G10)

LIGHTING PLANT in excellent condition for immediate removal from Llanvair Grange, near Abergavenny, comprising 13 h.p. Lister diesel twin cylinder engine, direct coupled to 100/150 V generator, large switchboard and 56 400 ampere-hour batteries. Also Maudesley D.C. ¼ h.p. 100 V motor with starter and Newton 5 h.p. motor with starter. Apply W. A. Lewis, 46 Cross St, Abergavenny. (G 707)

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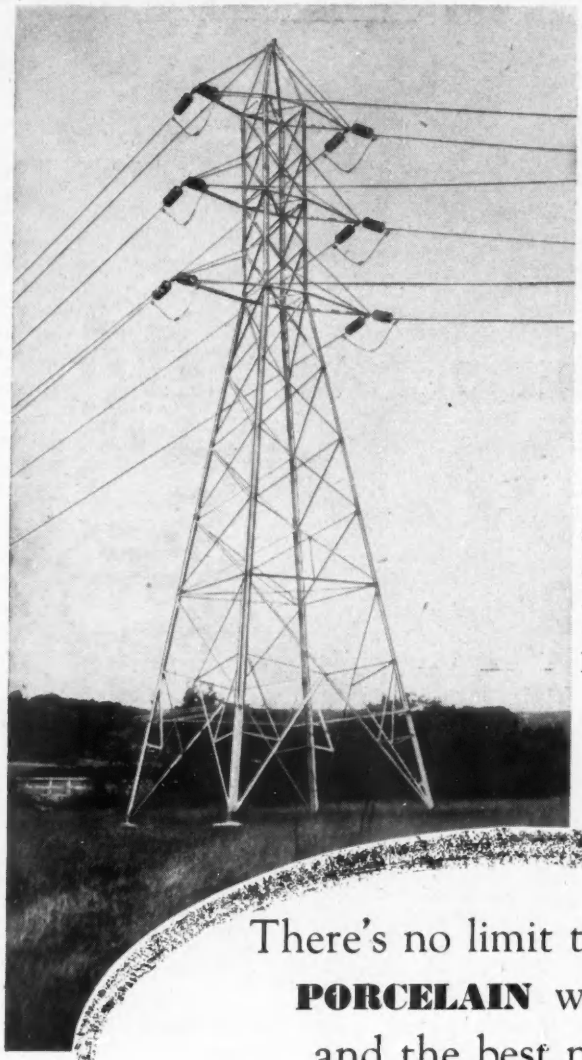

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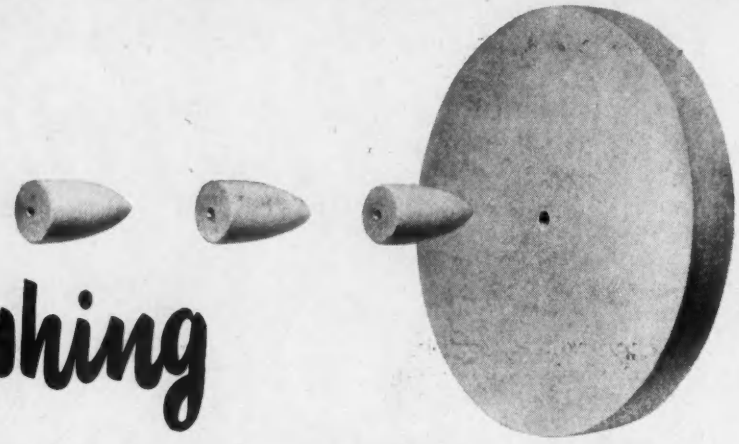

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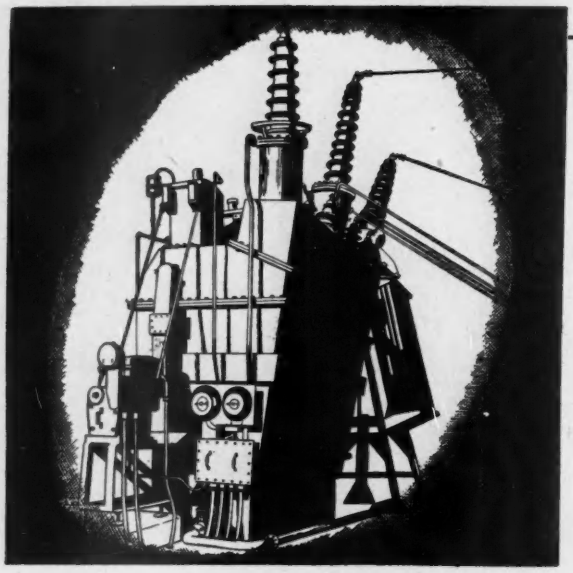

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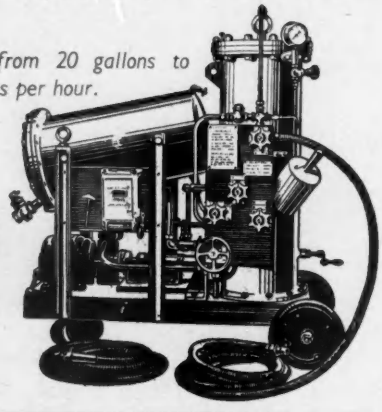

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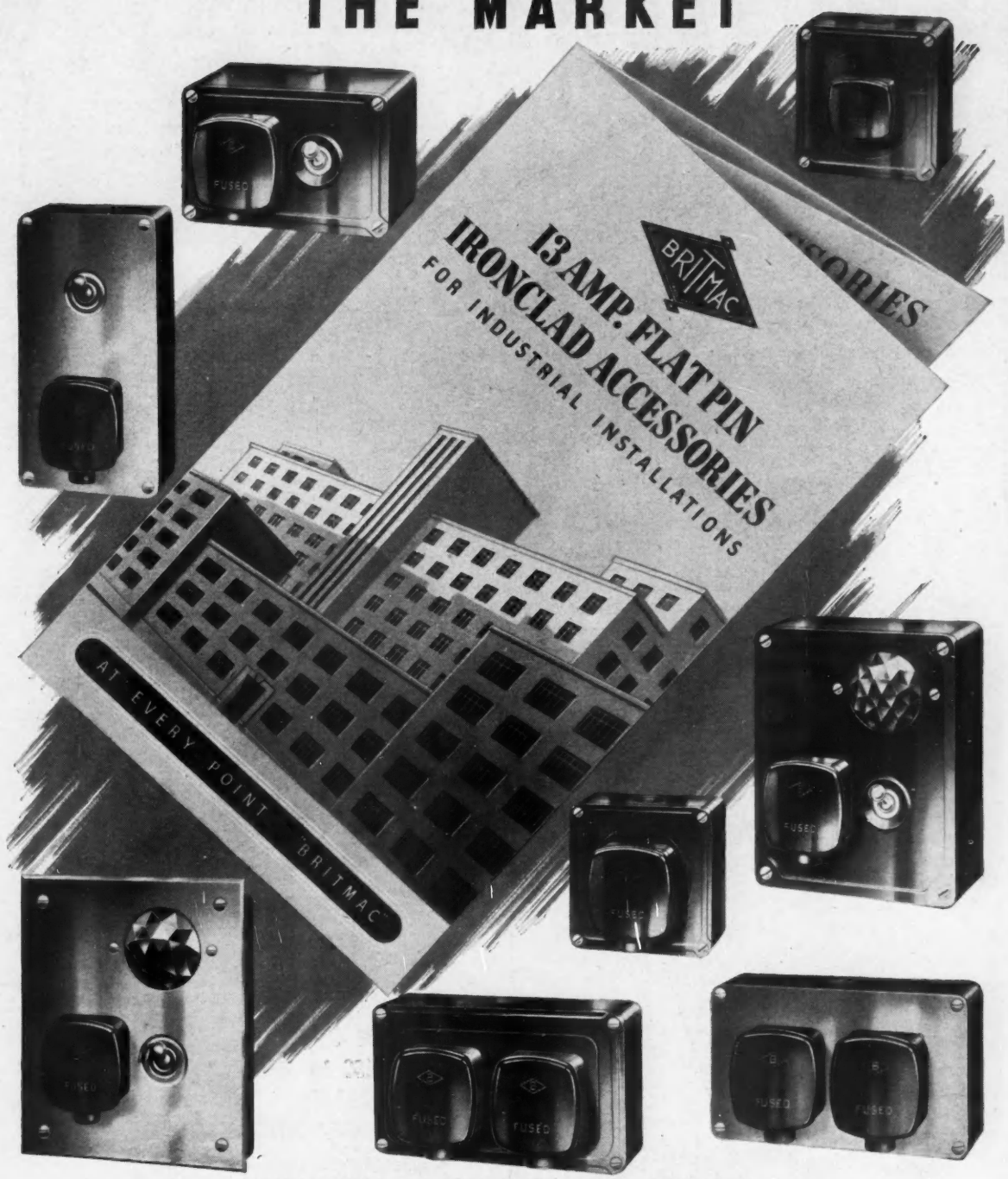

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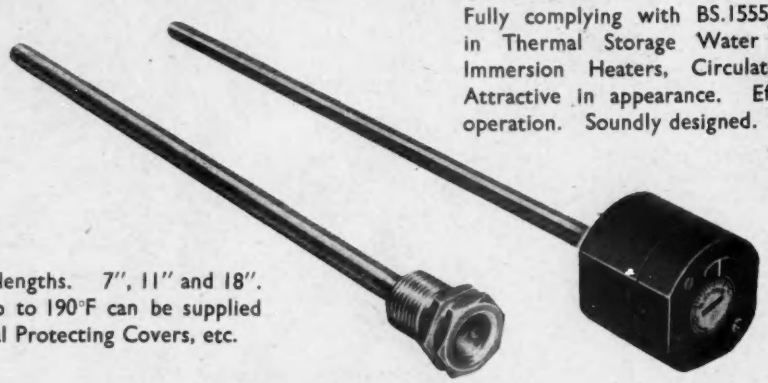

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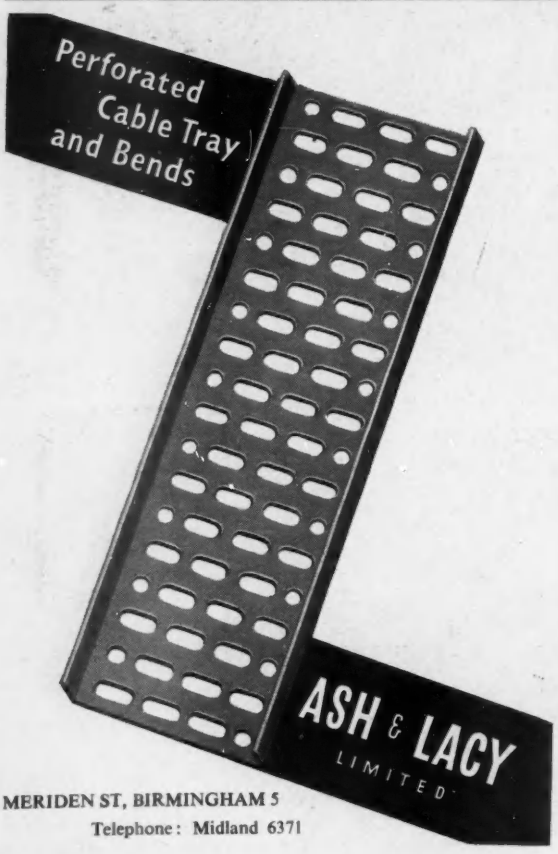

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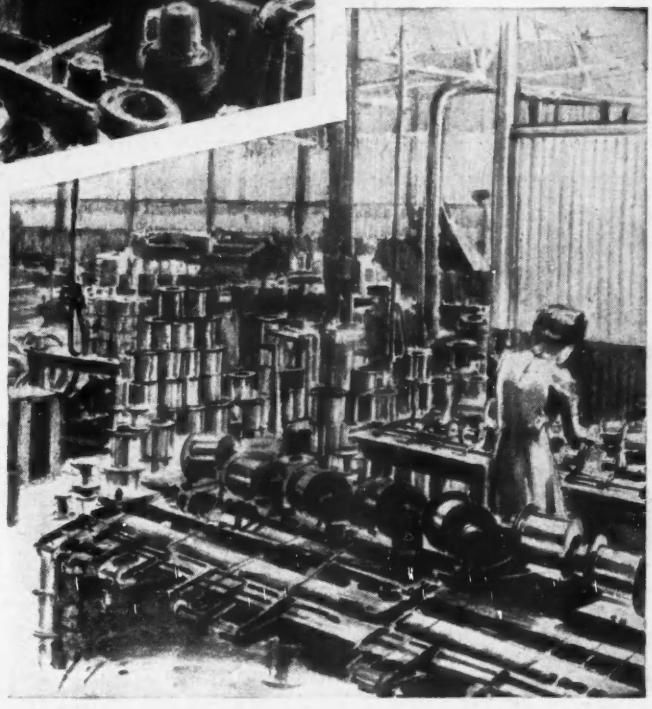

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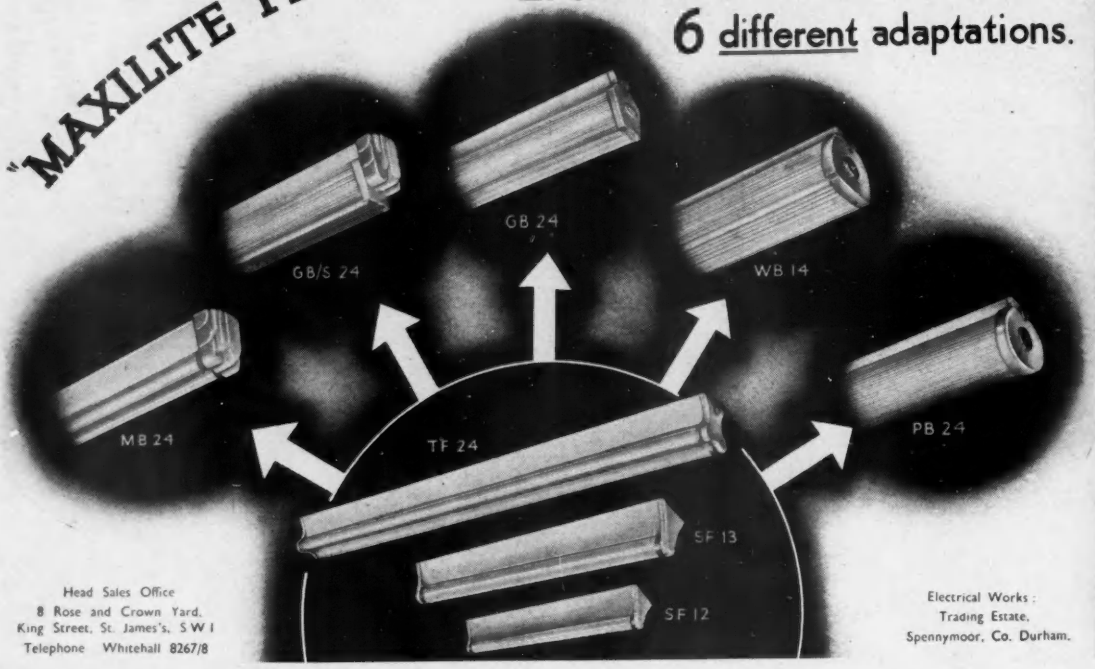

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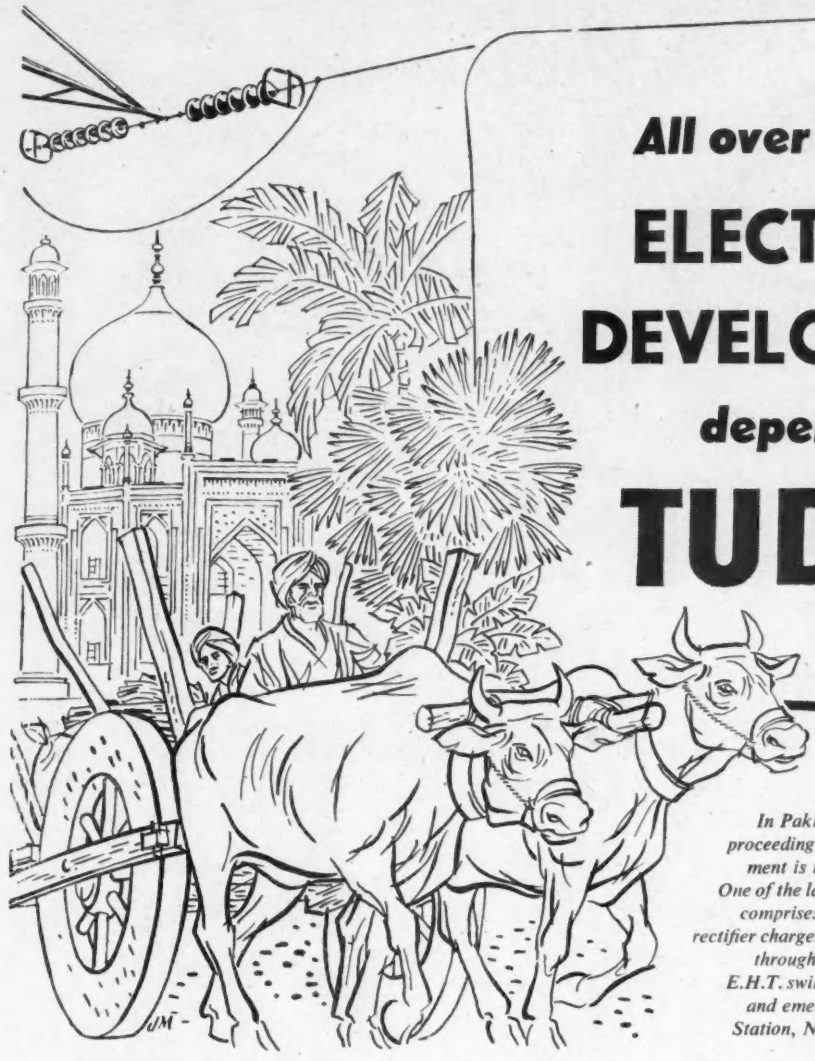

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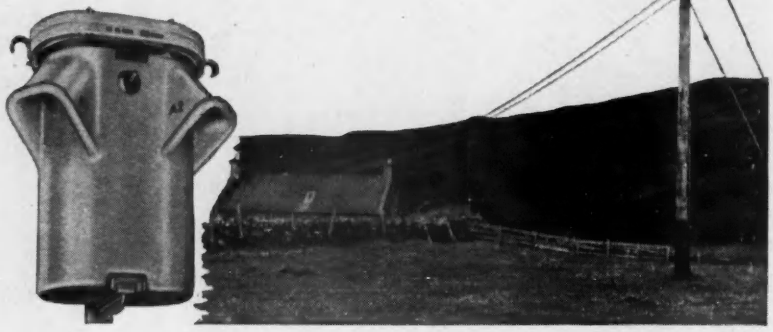

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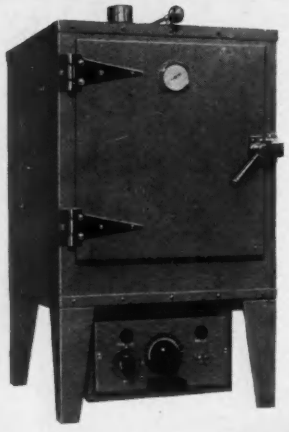

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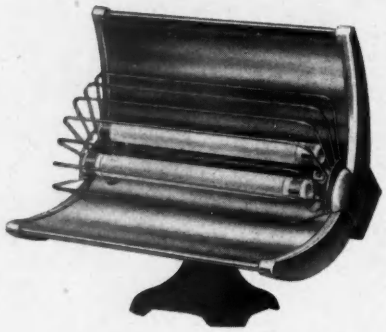

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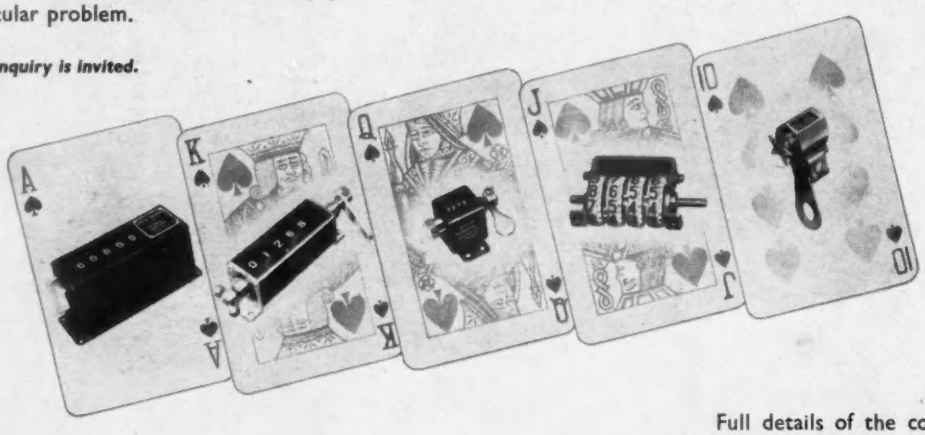

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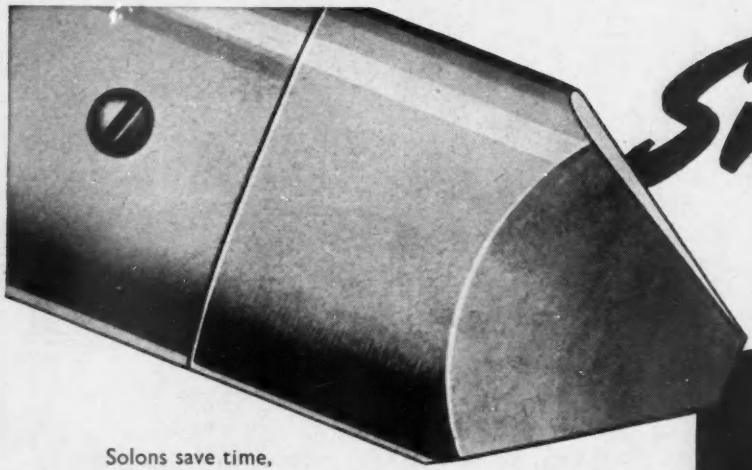

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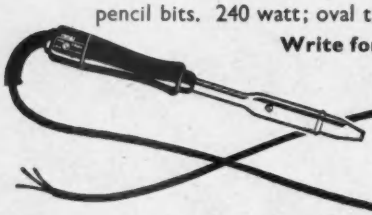

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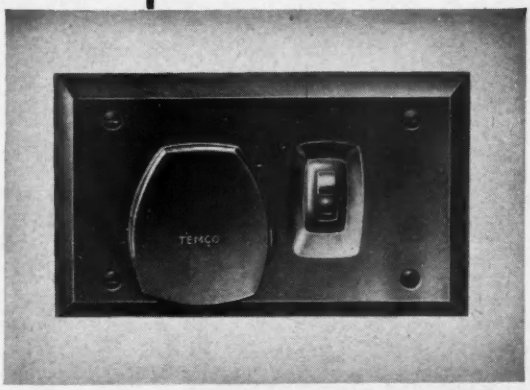

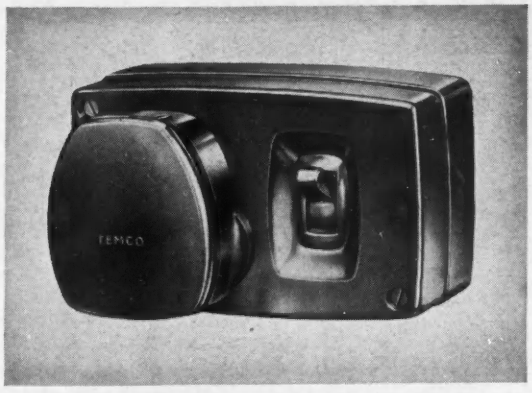

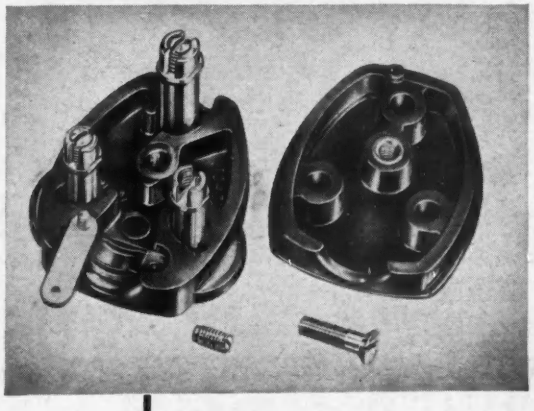

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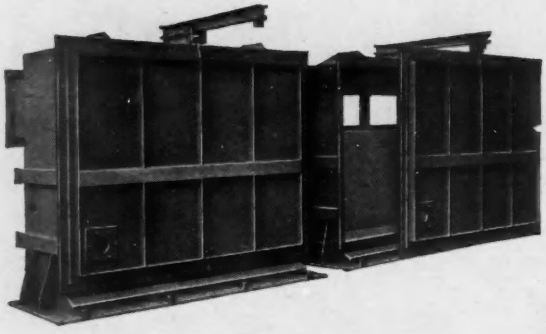

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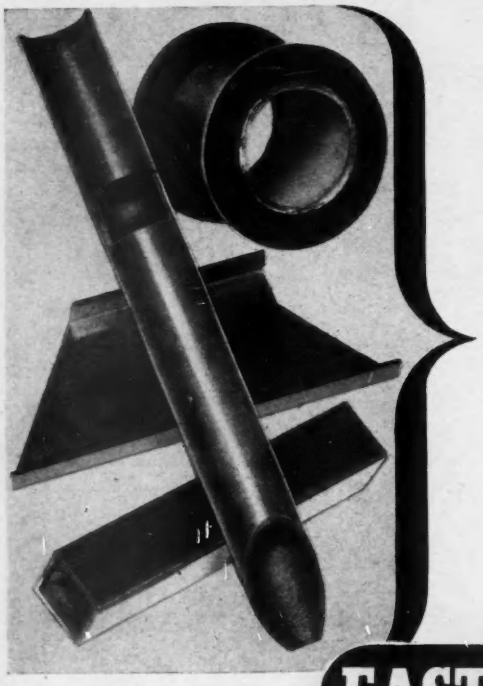

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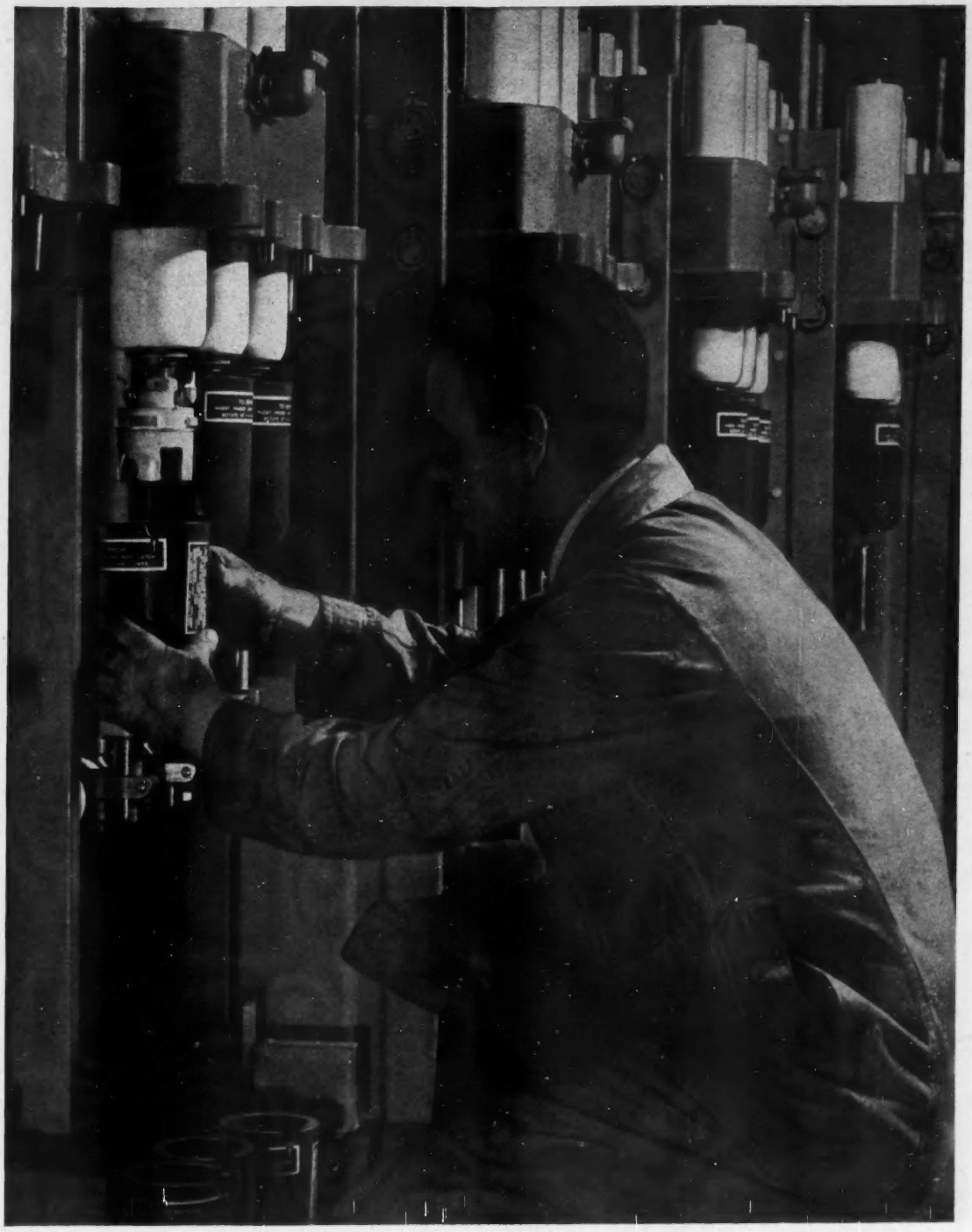

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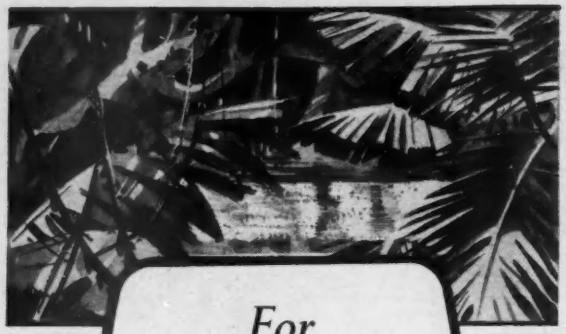

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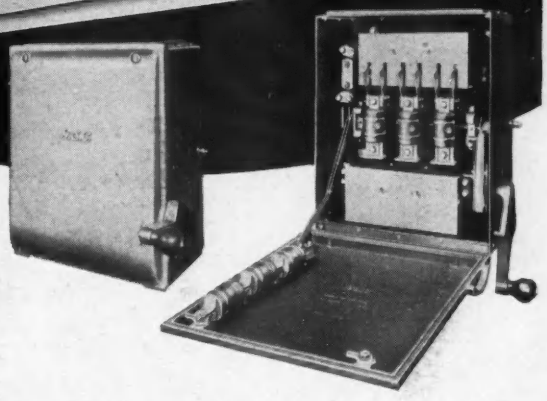

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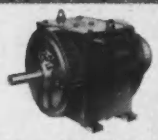
the	BRUSH		Square	Path
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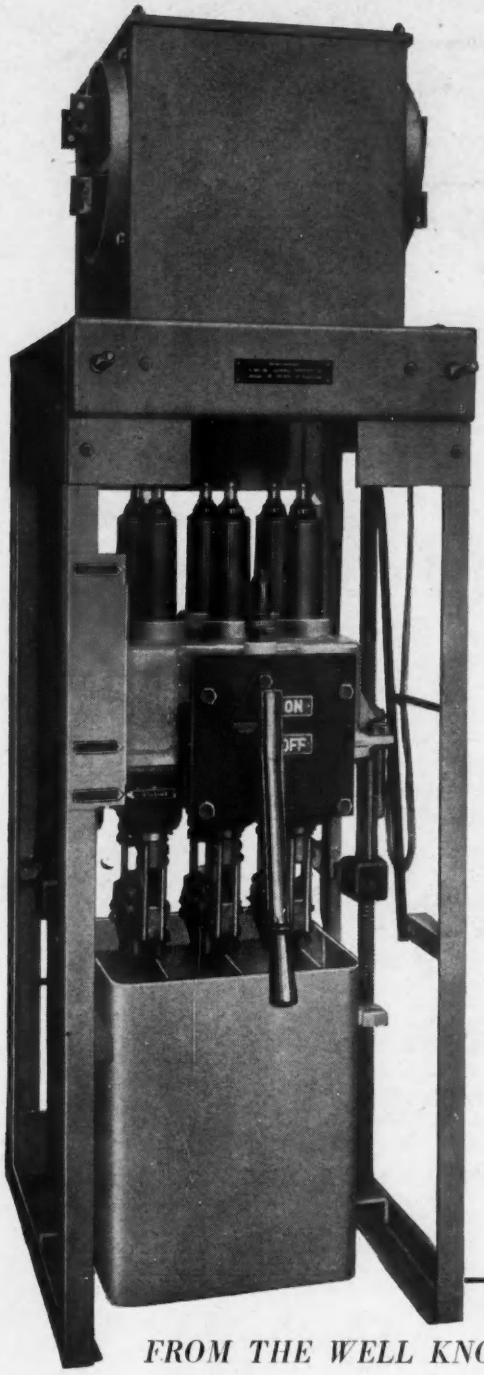

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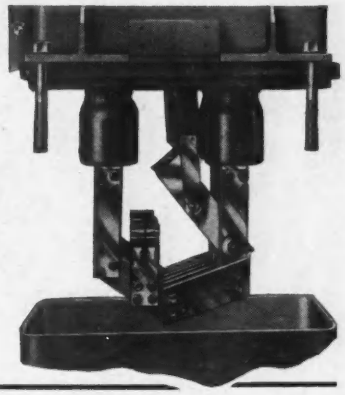

★ Internal view of a unit showing contact arrangement

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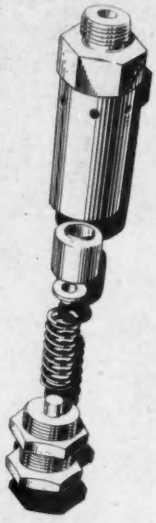

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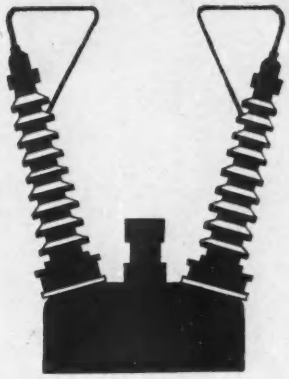

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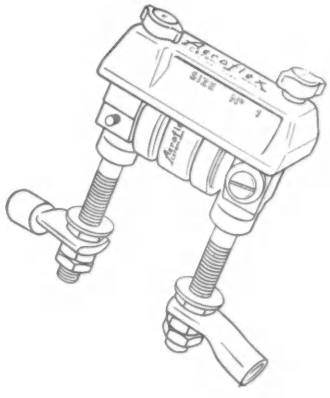

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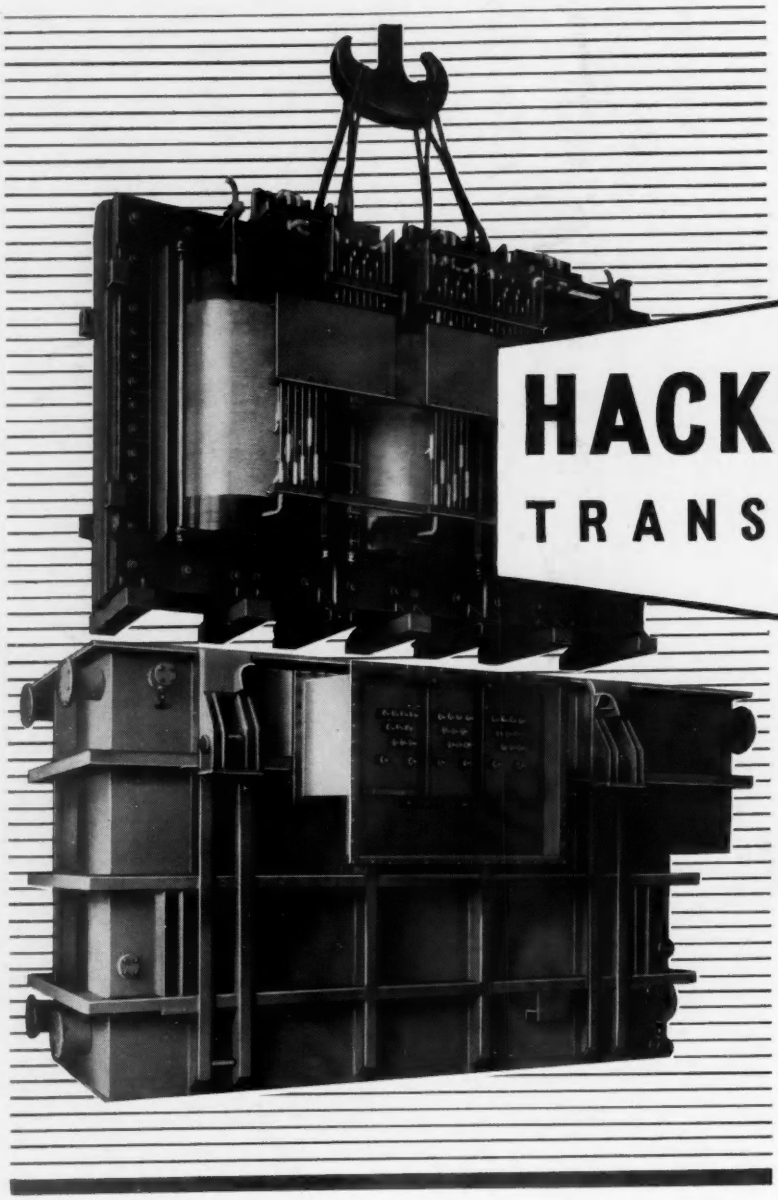

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